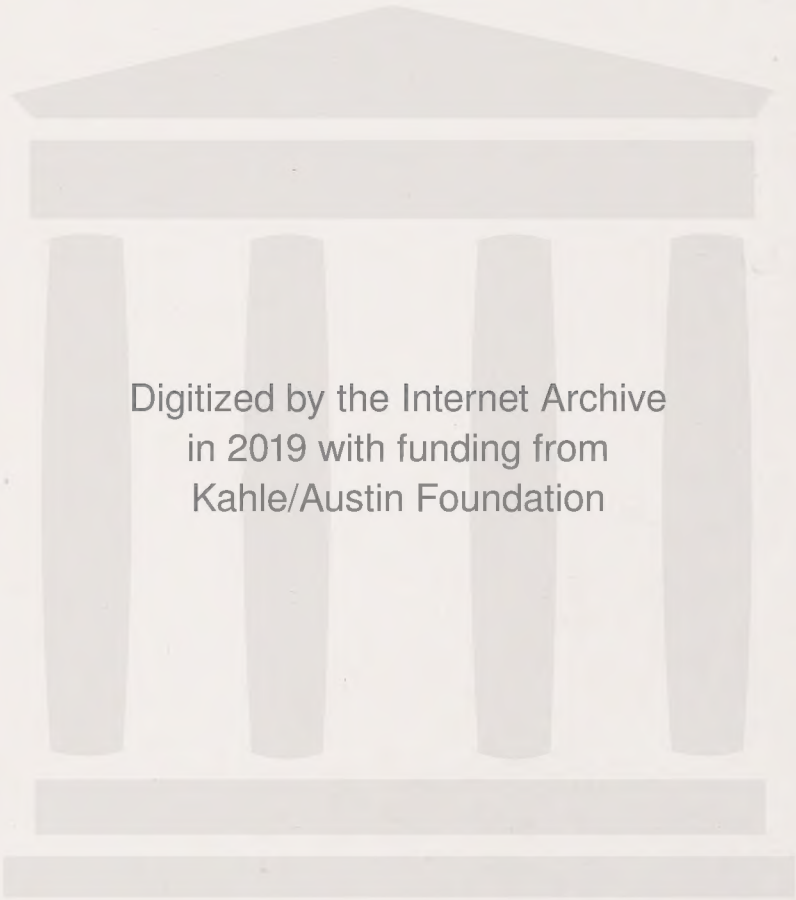
ATLAS OF THE COMMERCIAL WOODS OF THE UNITED STATES



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FRANKLIN MOON, Dean

ATLAS OF THE COMMERCIAL WOODS OF THE UNITED STATES

BY

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PREFACE

The successful practice of wood utilization requires on the part of the utilist a fundamental knowledge of the raw product wood. Not only must he be conversant with its physical and chemical properties to utilize it intelligently, but at the same time he must be able to recognize the various kinds which are available for purchase on the open market, and which differ so markedly in their properties and uses. Our forestry schools long since recognized this need and courses in wood structure and identification are invariably included in their curricula.

Confusion has always existed in the trade as to the identity of our commercial timbers, even among those who have handled them for years, and costly mistakes have resulted which could easily have been avoided had the proper information been available. There is no mystery about wood identification. Anyone, be he dealer, carpenter, or layman, can readily learn to recognize our common timbers if he will but train his powers of observation and persevere until he has mastered the subject. The universal use of wood for so many purposes in this country makes it a necessary part of our every-day existence; ability to identify the common kinds will save embarrassment and expense.

This Atlas of the Commercial Woods of the United States is an attempt to supply visual information of first importance in the identification of fifty-seven of our commercial timbers. While wood may be studied to advantage in three planes of section, it is the transverse section, that is, the surface exposed on the end of a log which offers the best aids to correct determination. Here at low magnification (10 X) the general topography of the wood is revealed, the width of the seasonal rings, the texture, the size and distribution of pores and rays, and the several other features of first importance in identification. In teaching the recognition of our various timbers, the visual method must be employed; while the wood of a given species may vary remarkably according to conditions of growth it still maintains a characteristic structural topography. Basswood is always basswood and oak is always oak, no matter what the idiosyncrasies or vicissitudes of tree growth.

Photographs of transverse sections of wood at low (hand lens) magnification are of inestimable value to the novice in identification since the several structural characteristics are shown in clear

detail and he learns to recognize at the start the diagnostic features of a given species. My experience in teaching wood identification through two decades has served to demonstrate the above beyond question. But photographs of the right type unfortunately have not been available up to the present time. Often the magnification was too great and the area too restricted to make the pictures of any real value. Comparison of the "mental" photograph obtained when a wood was examined in transverse section with the naked eye or hand lens and the photomicrograph prepared by the usual method at high magnification has led to confusion. Reproductions at a few diameters covering a field sufficient to show the general topographic features of the wood are required.

Further confusion has arisen since the "mental" photographs obtained with the hand lens by reflected light are negatives (the pores of the wood appear dark) while the photomicrographs as usually prepared are positives, that is, plates or films are exposed and prints are made from these, resulting in "light" pores. A photomicrograph, at low magnification, to be of real value in wood identification, should show as nearly as possible the wood as it appears in transverse section under the hand lens.

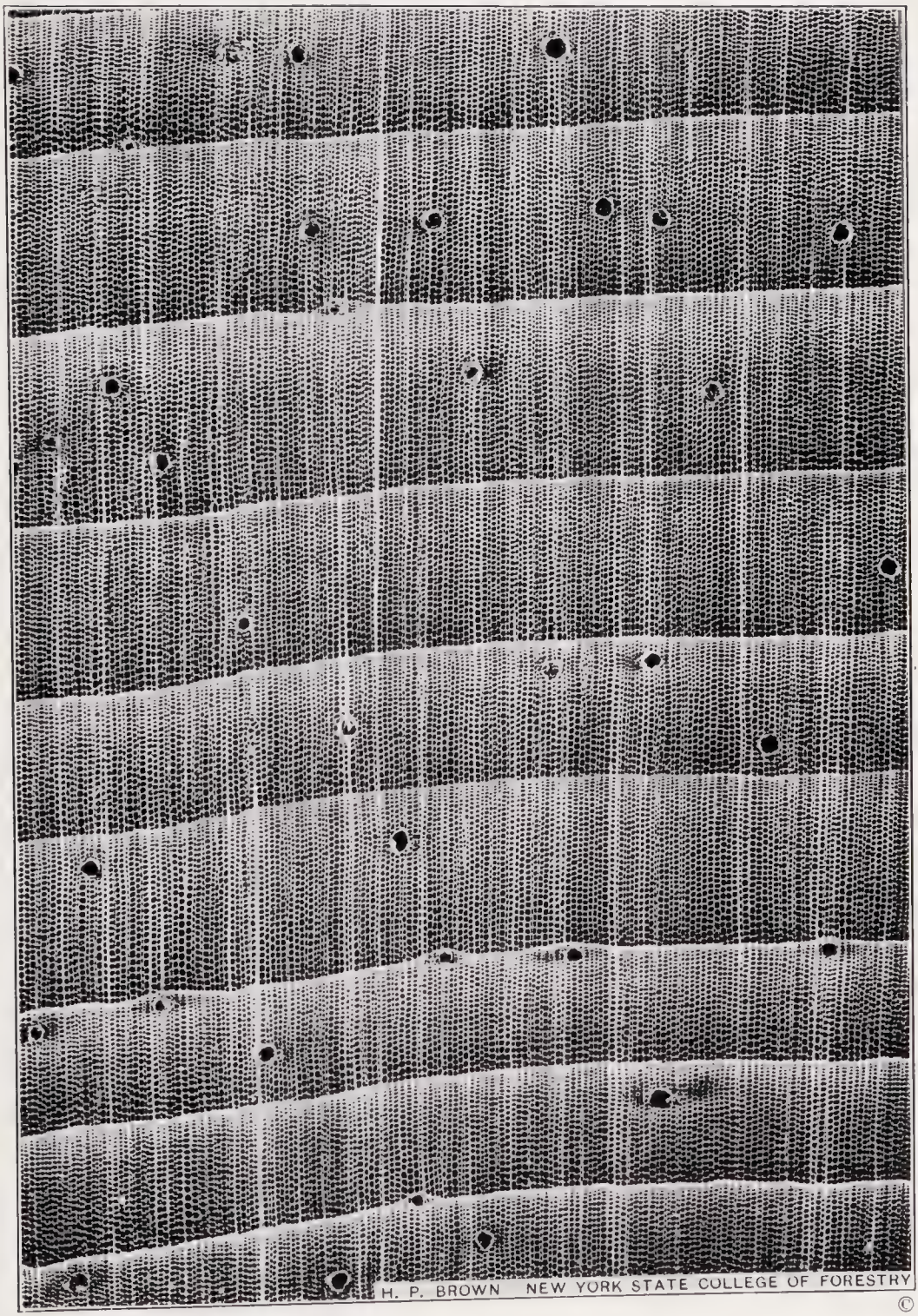
The photographs from which the "cuts" were prepared in the Atlas were negative prints. Thin sections of wood were made and carefully stained, and then photographed by transmitted light, using the proper ray filters. Photographic paper was inserted in the camera in place of the usual plate or film, resulting in a negative print. The method is open to criticism since but one picture can be made from an exposure. So accurate is it, however, that this criticism is far outweighed by the results achieved. Permanent slides may be kept on file from which the preparation of negative prints is but a question of minutes. Plates 58, 59 and 60 which depict the cell types of three different woods are indicative that the method of negative prints may be recommended for high magnifications. The elements of the three woods in question were photographed directly upon paper.

It has seemed inadvisable to include keys for identification in the Atlas. The wood technologists at the various forestry schools have evolved their own keys to which they are committed through familiarity. The photographs may be used to advantage with any key or without a key through comparison alone. It is the author's hope that they may prove a boon to wood identification, not only in the forest schools, but to all who are interested in wood as a raw product or obtain their livelihood from the sale or manufacture of it.

H. P. BROWN, PH. D.

INDEX

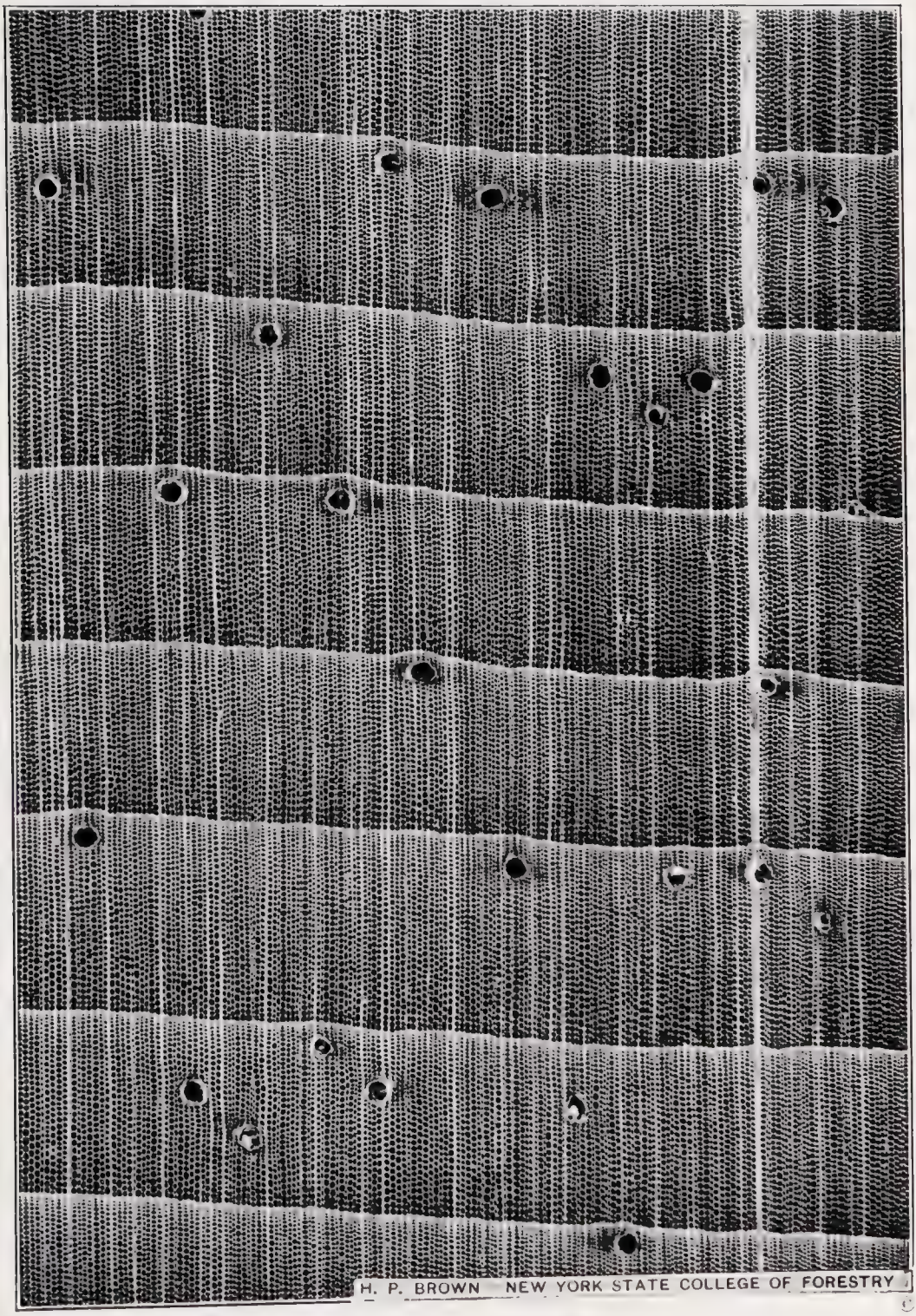
COMMON AND SCIENTIFIC NAMES



White Pine, Northern White Pine

Pinus Strobus L.

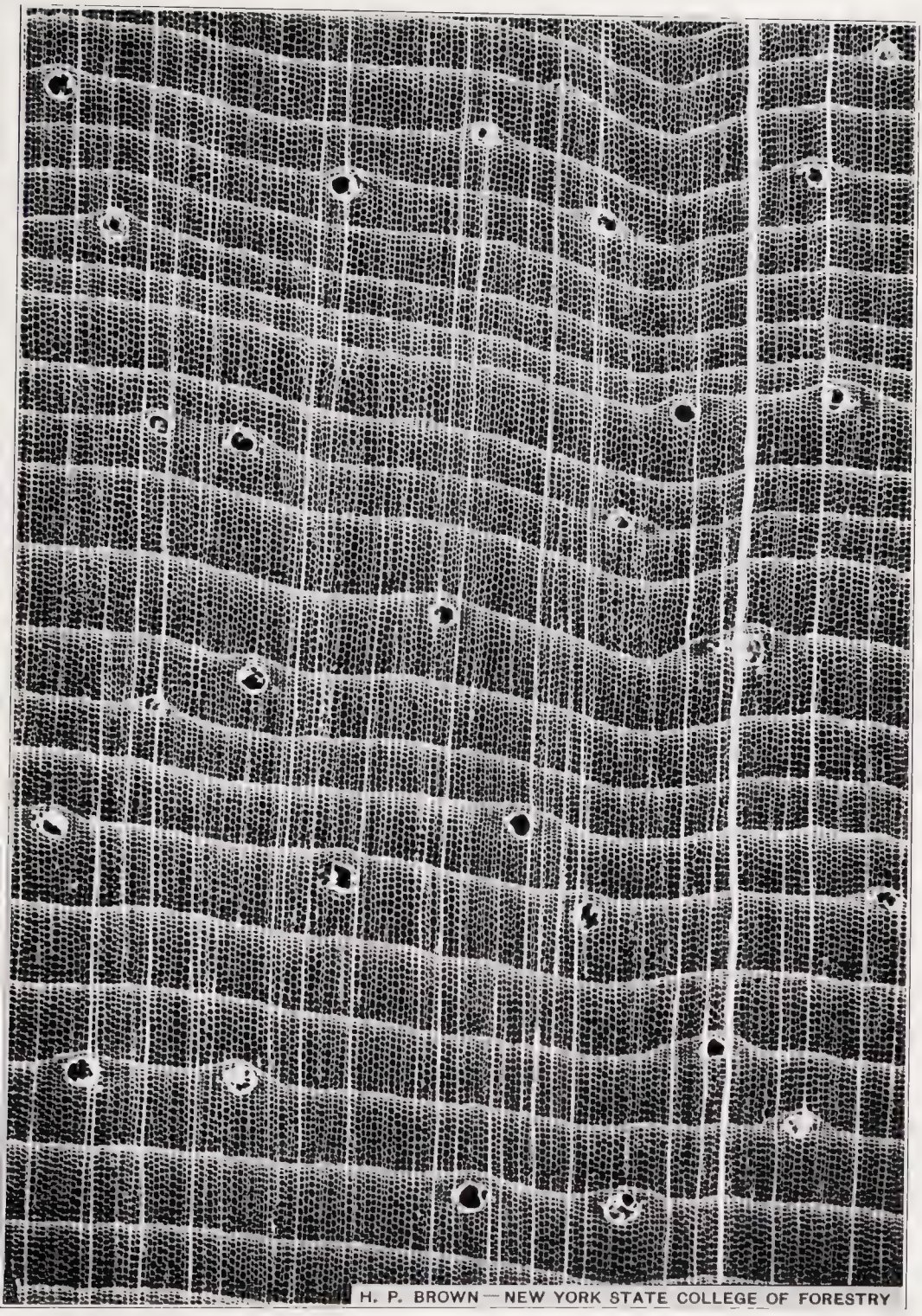
(X—15 diameters)



White Pine, Western White Pine

Pinus monticola D. Don.

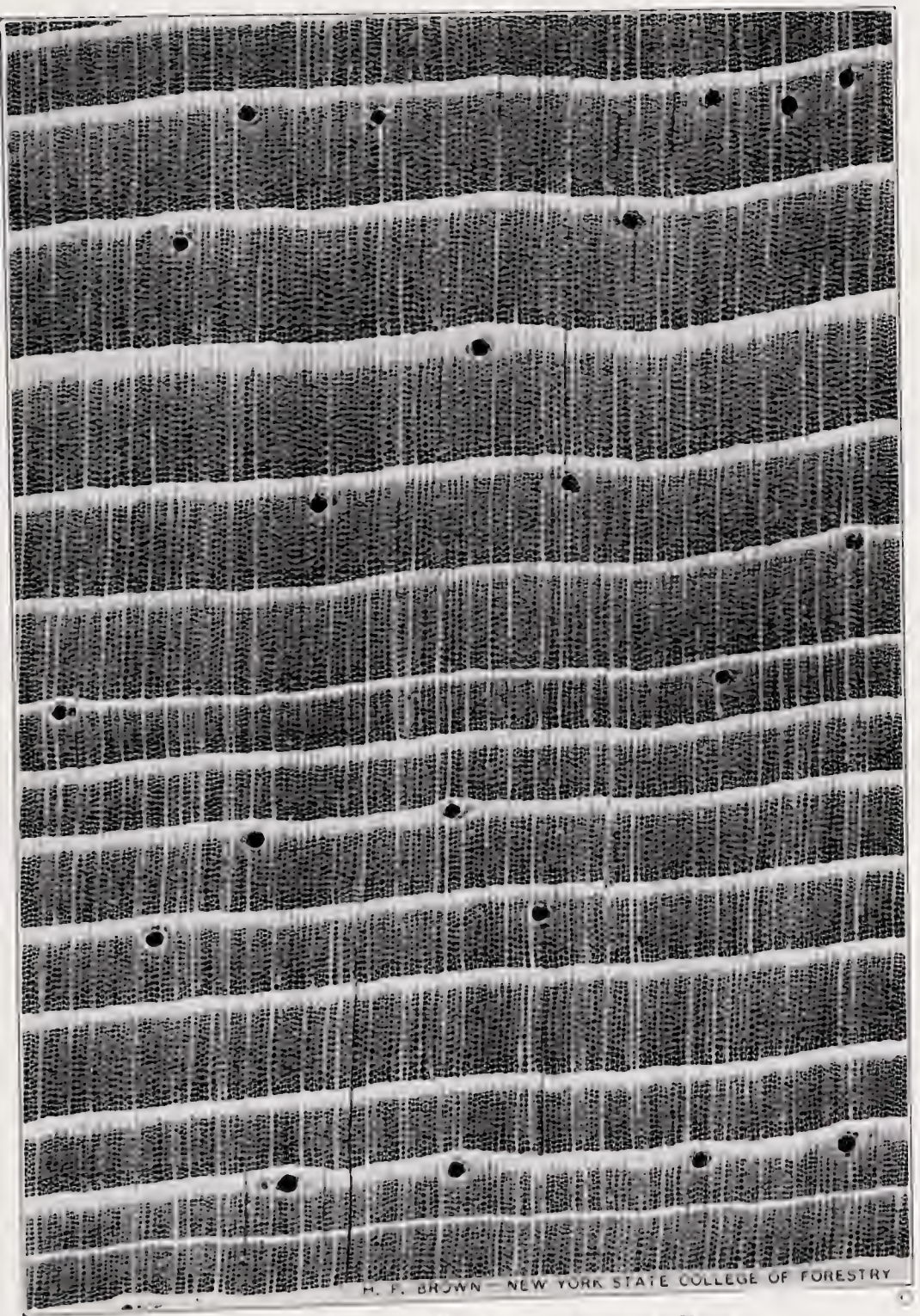
(X—15 diameters)



Sugar Pine

Pinus Lambertiana Dougl.

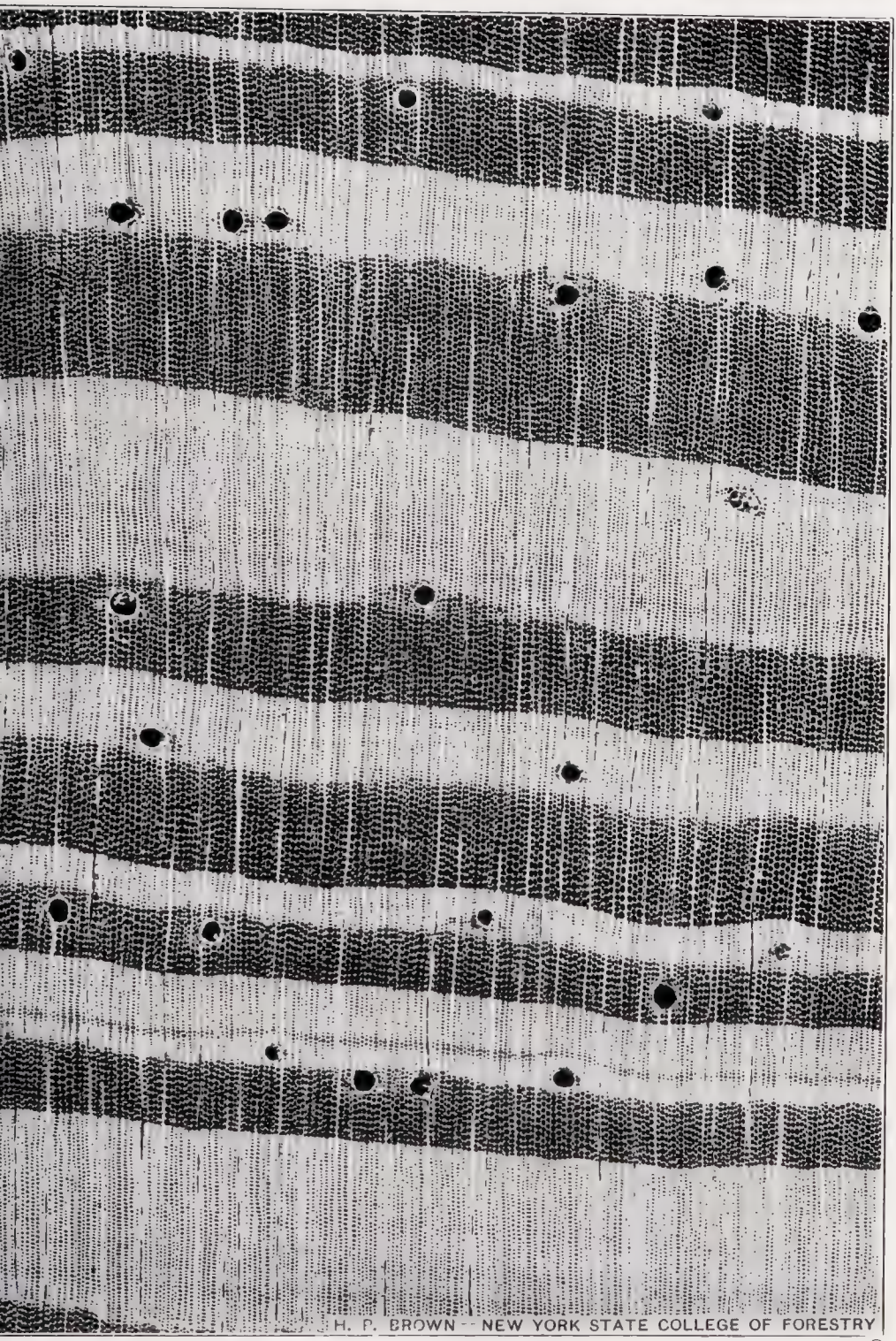
(X—15 diameters)



Yellow Pine, Western Yellow Pine

Pinus ponderosa Laws.

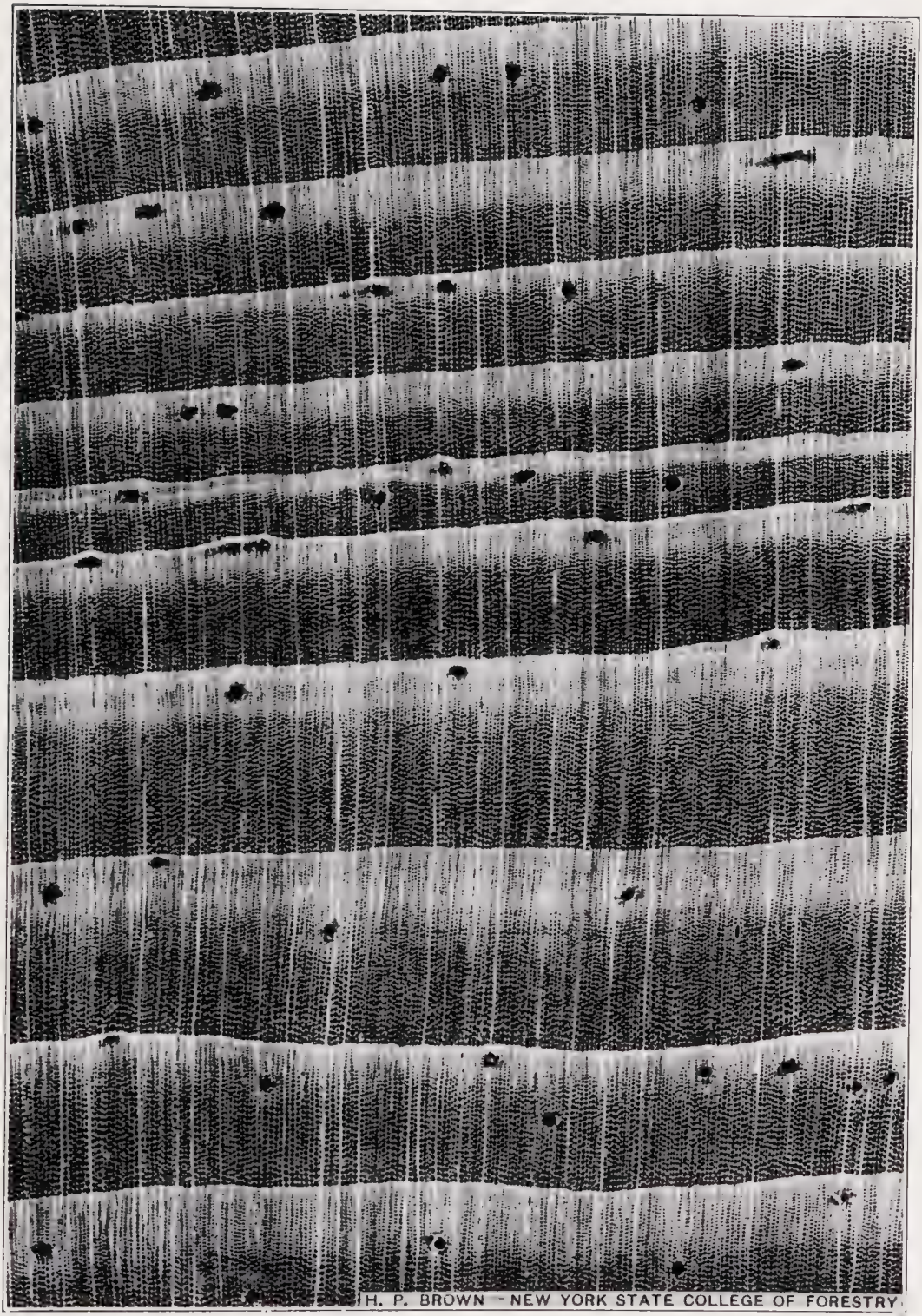
(X—15 diameters)



Longleaf Pine

Pinus palustris Mill.

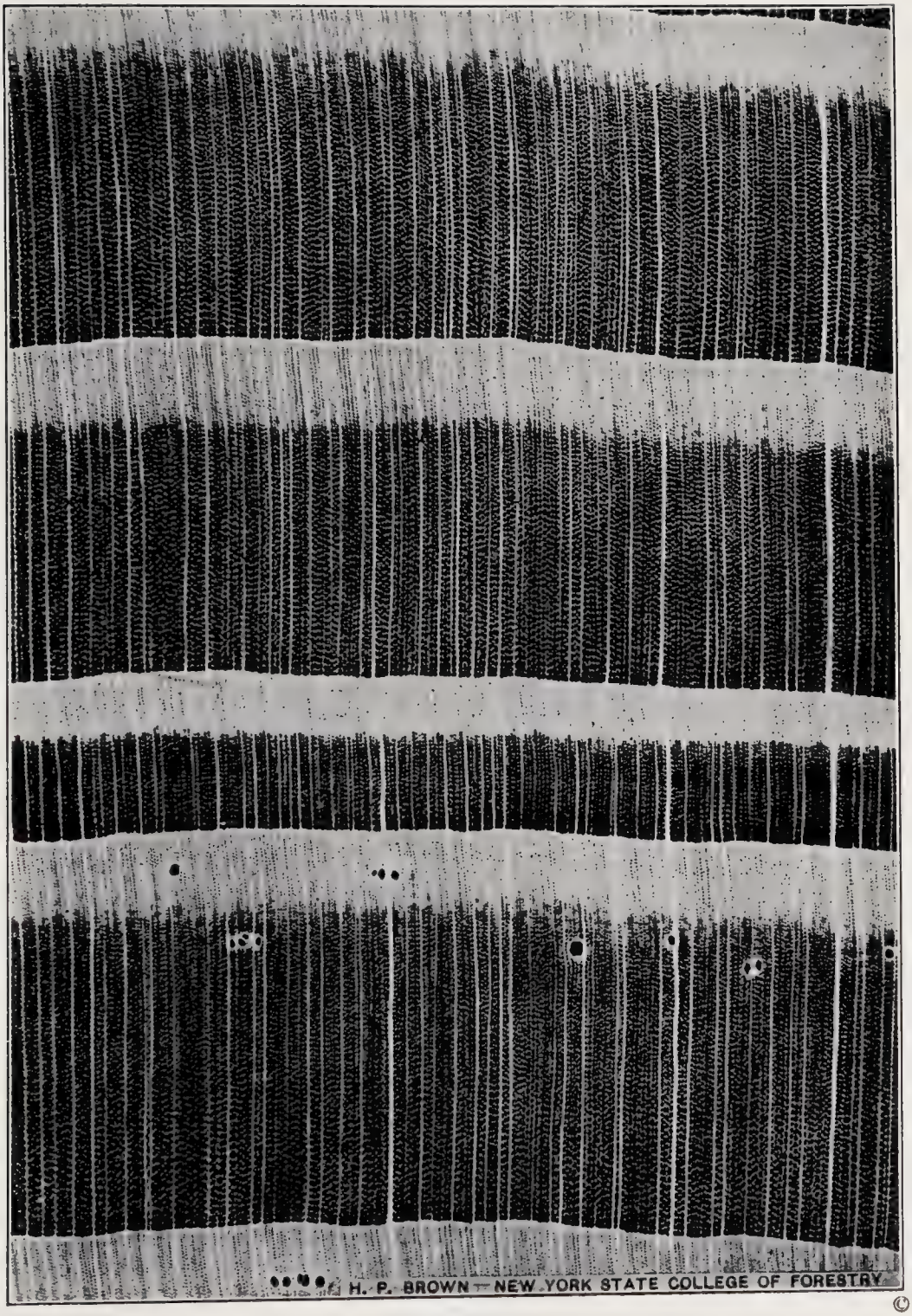
(X—15 diameters)



Red Pine, Norway Pine

Pinus resinosa Ait.; Pinus resinosa Sol.

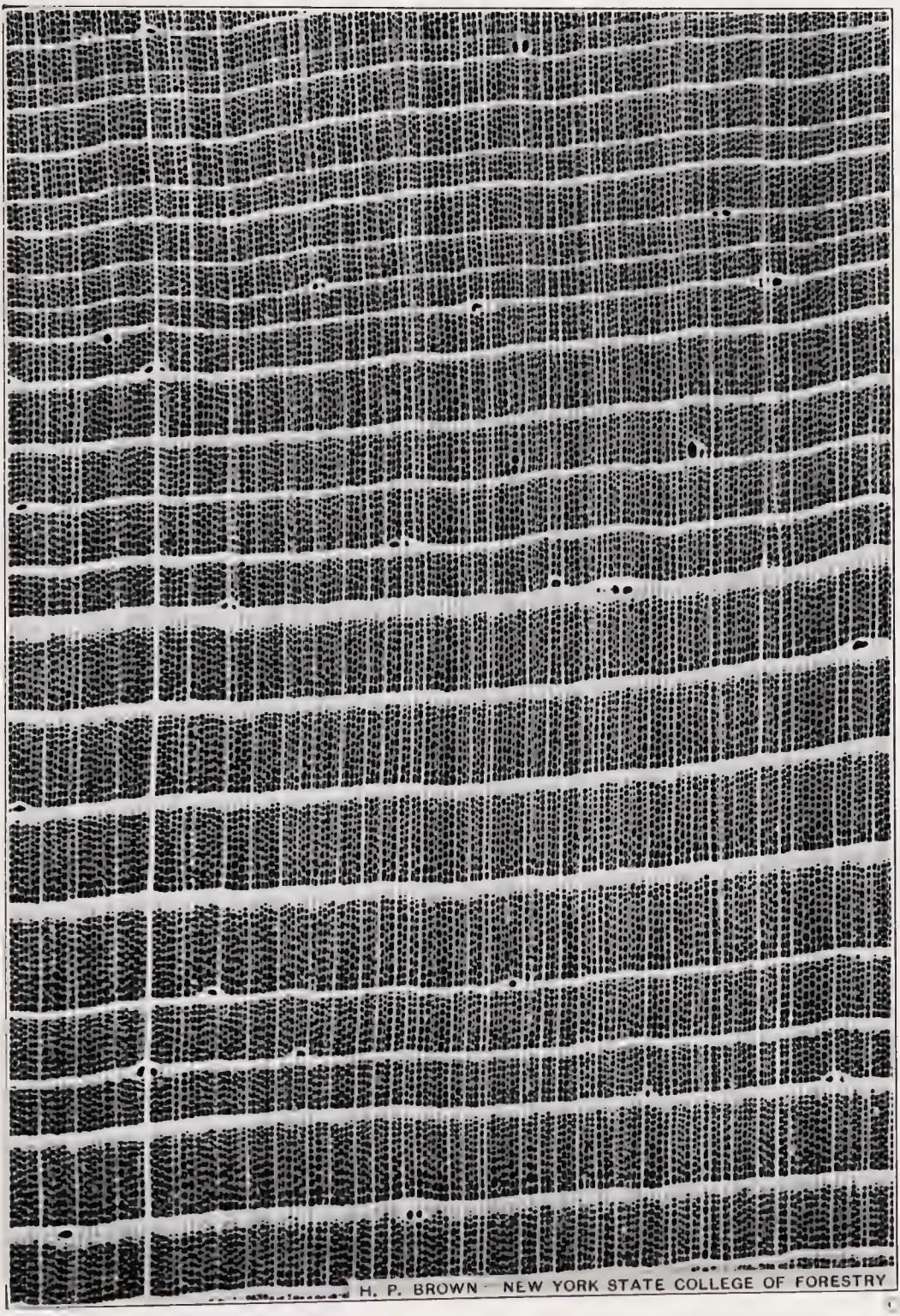
(X—15 diameters)



Tamarack

Larix laricina K. Koch.

(X—15 diameters)

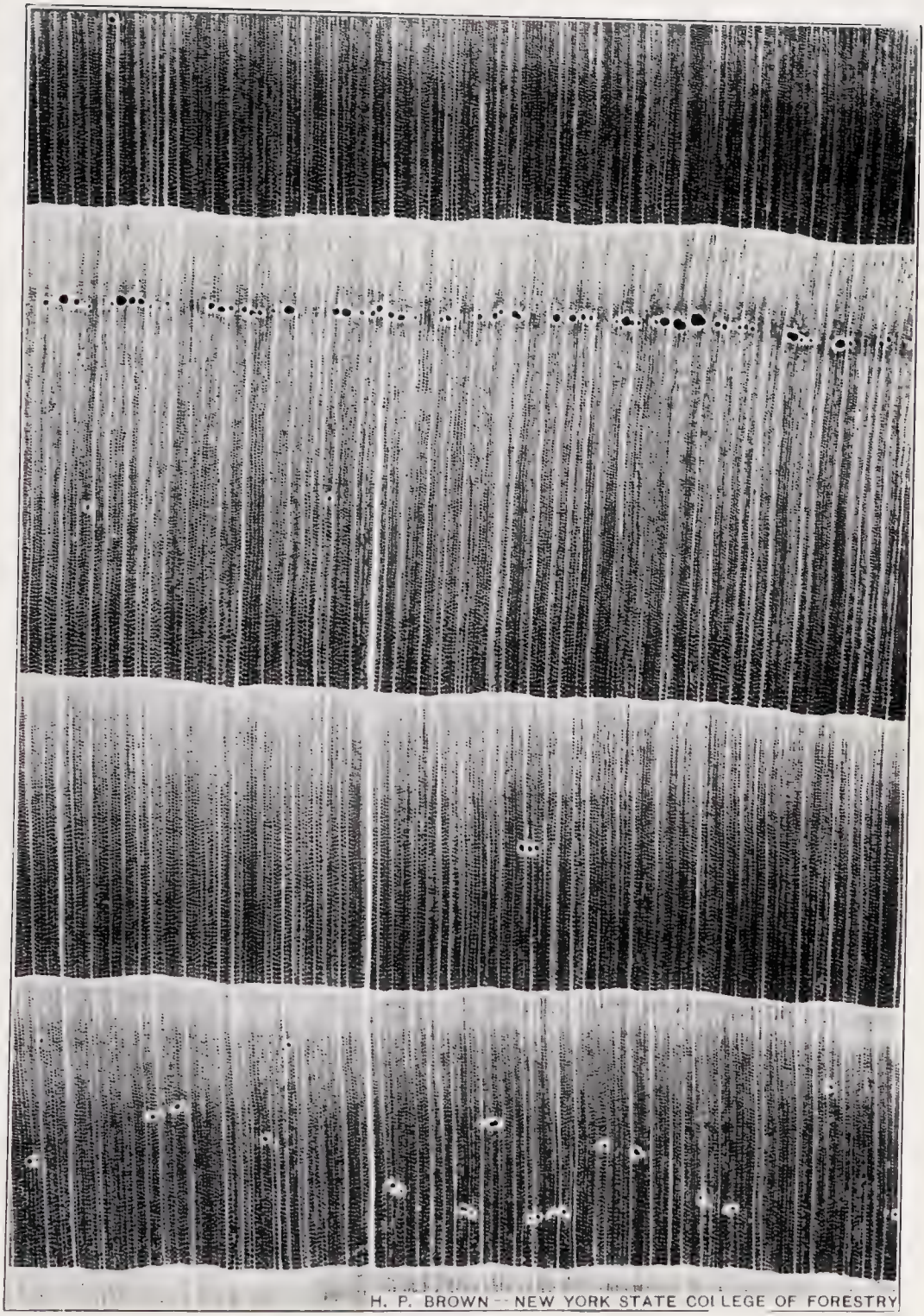


Western Larch

Larix occidentalis Nutt.

(X—15 diameters)

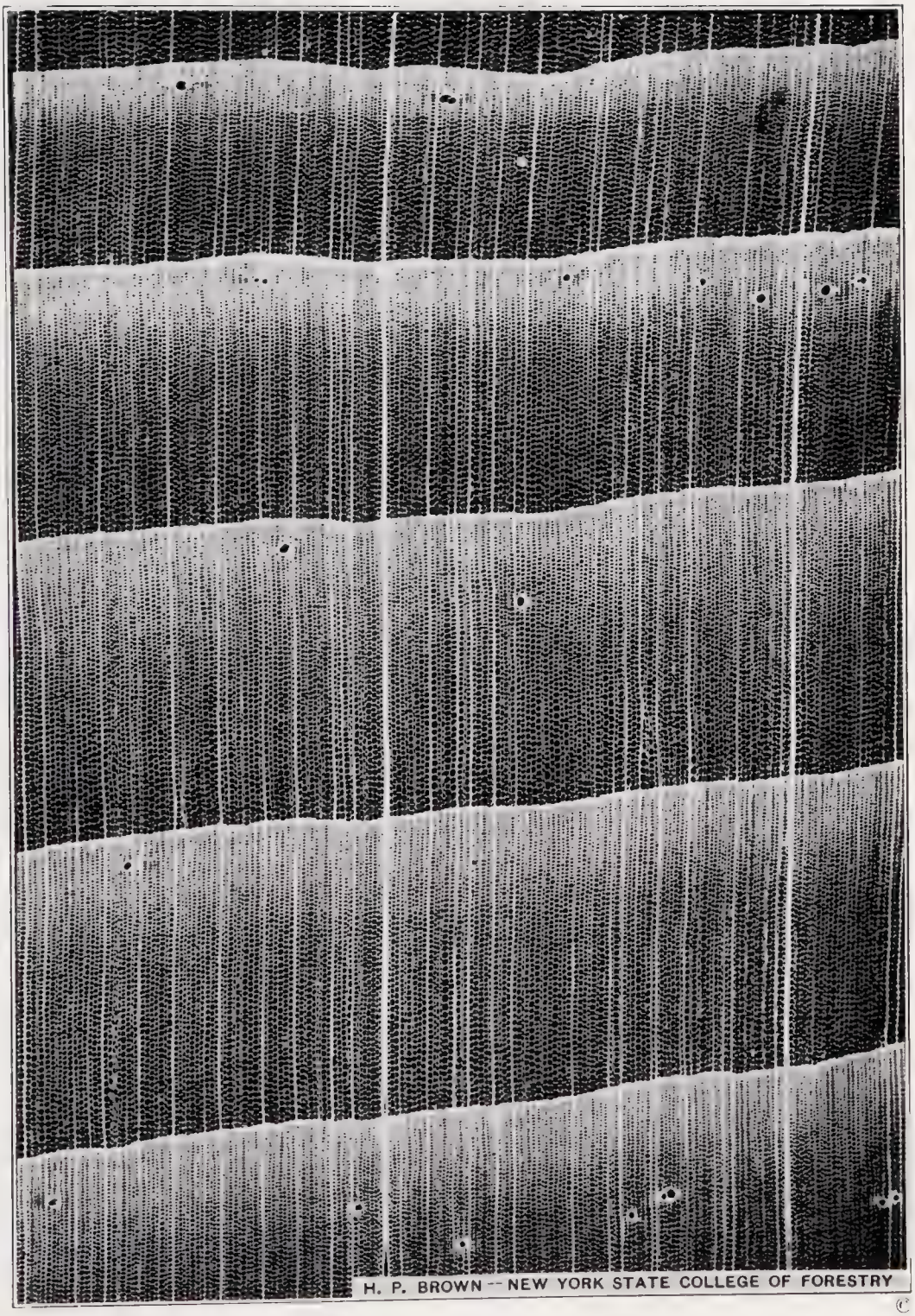
No. 9



Red Spruce

Picea rubra Link.

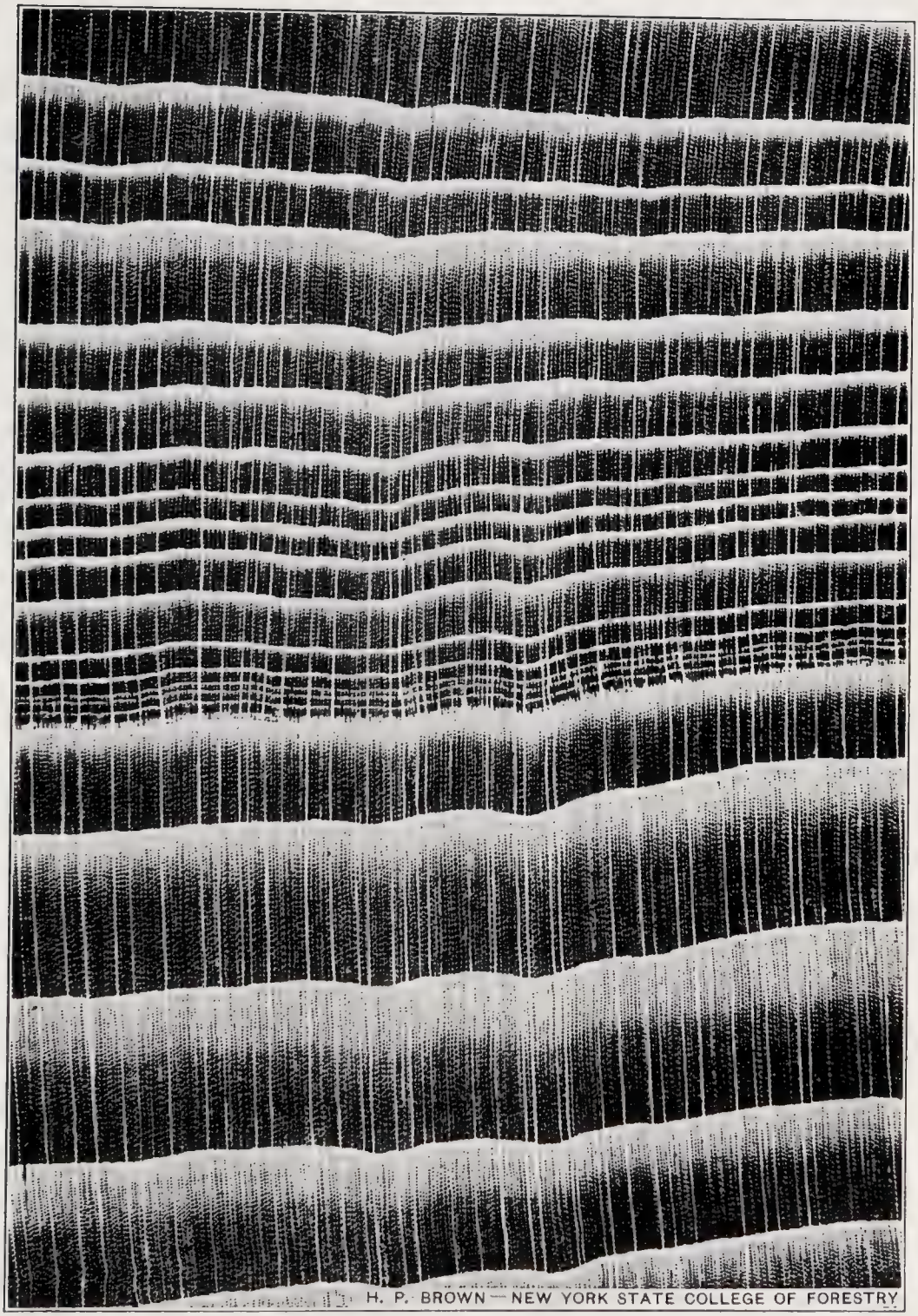
(X—15 diameters)



Tideland Spruce, Sitka Spruce

Picea sitchensis Carr.

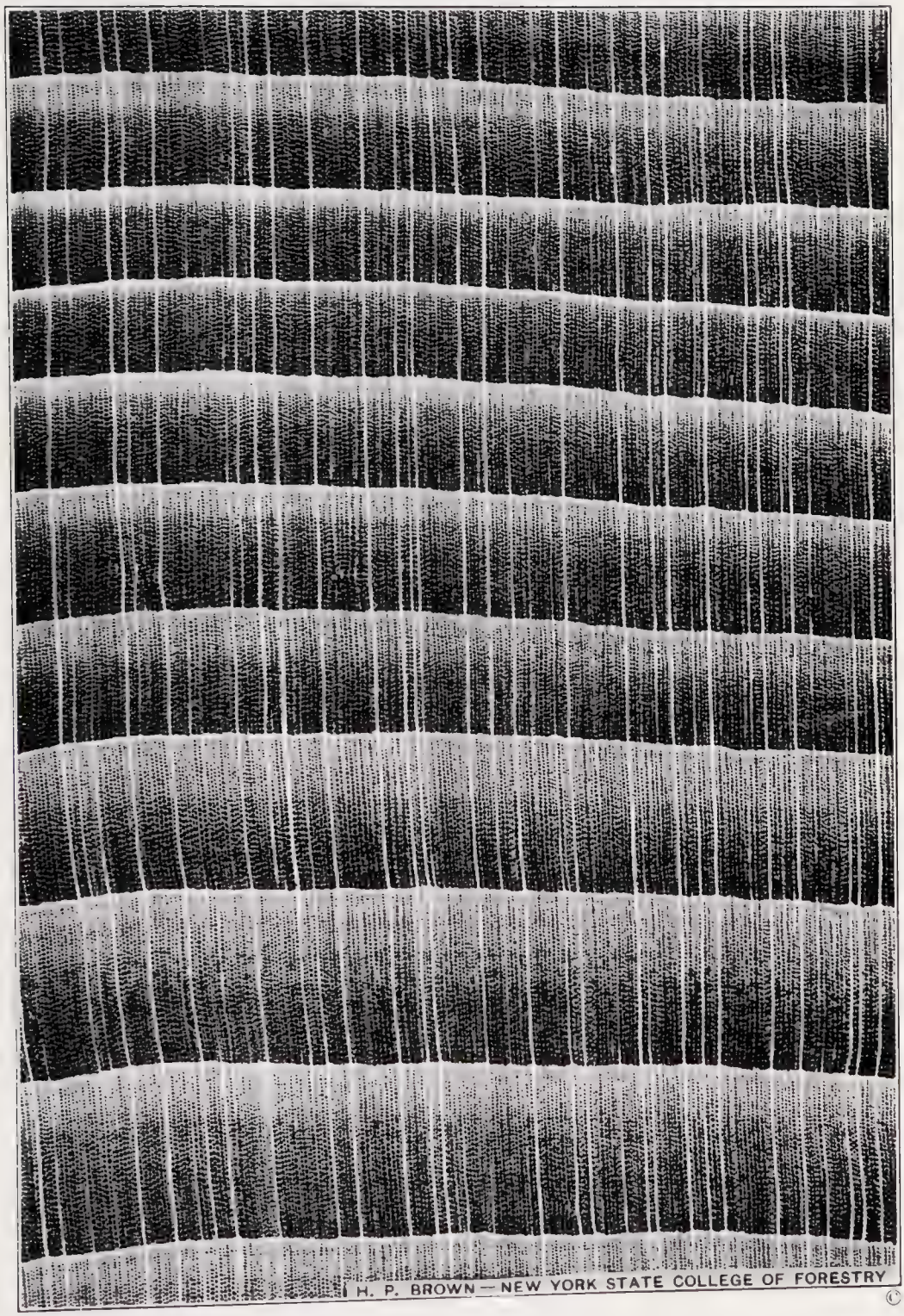
(X—15 diameters)



Hemlock, Eastern Hemlock

Tsuga canadensis Carr.

(X—15 diameters)



Western Hemlock

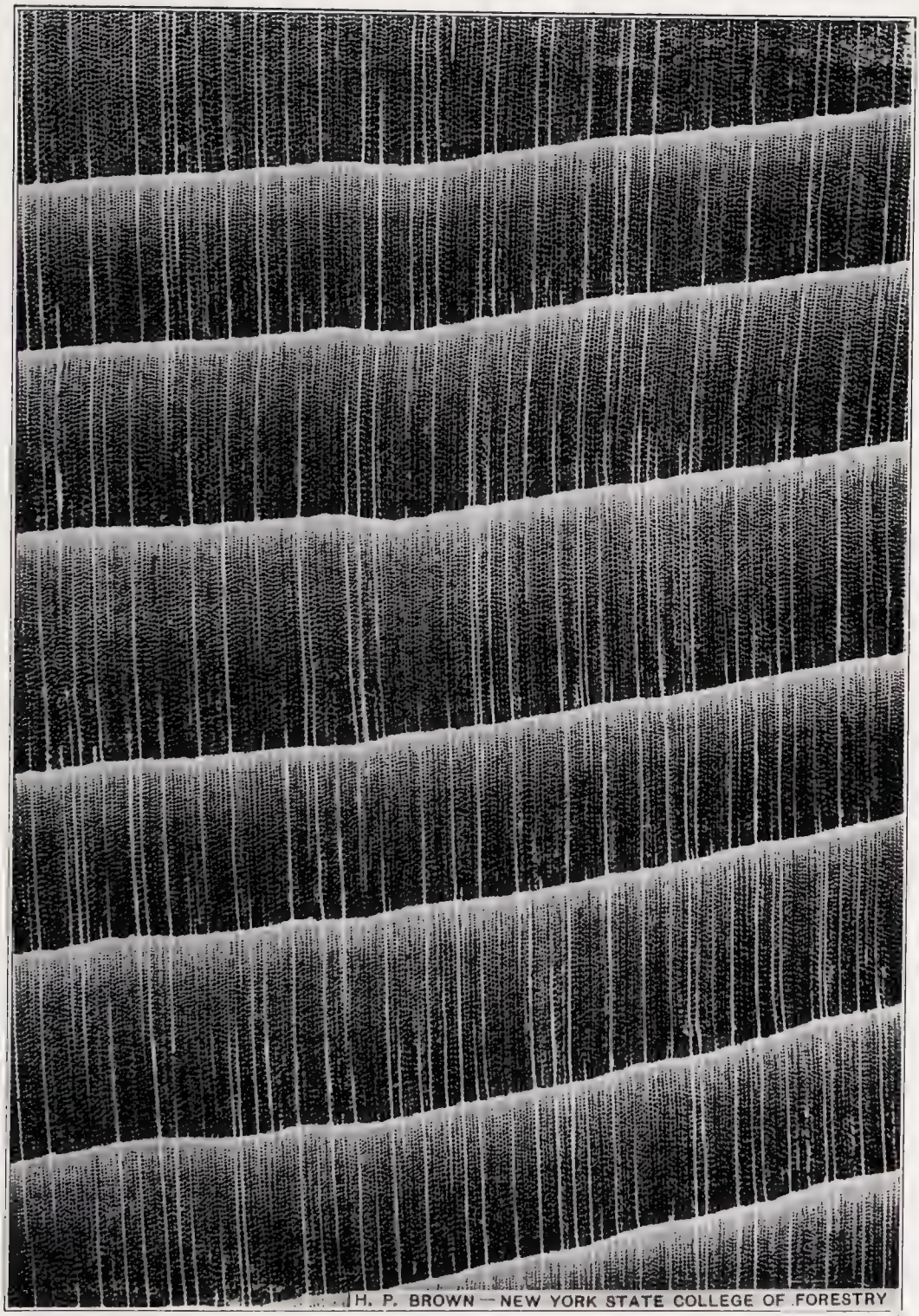
Tsuga heterophylla Sarg.

(X—15 diameters)

Douglas Fir, Douglas Spruce, Red Fir

Pseudotsuga taxifolia Britt.

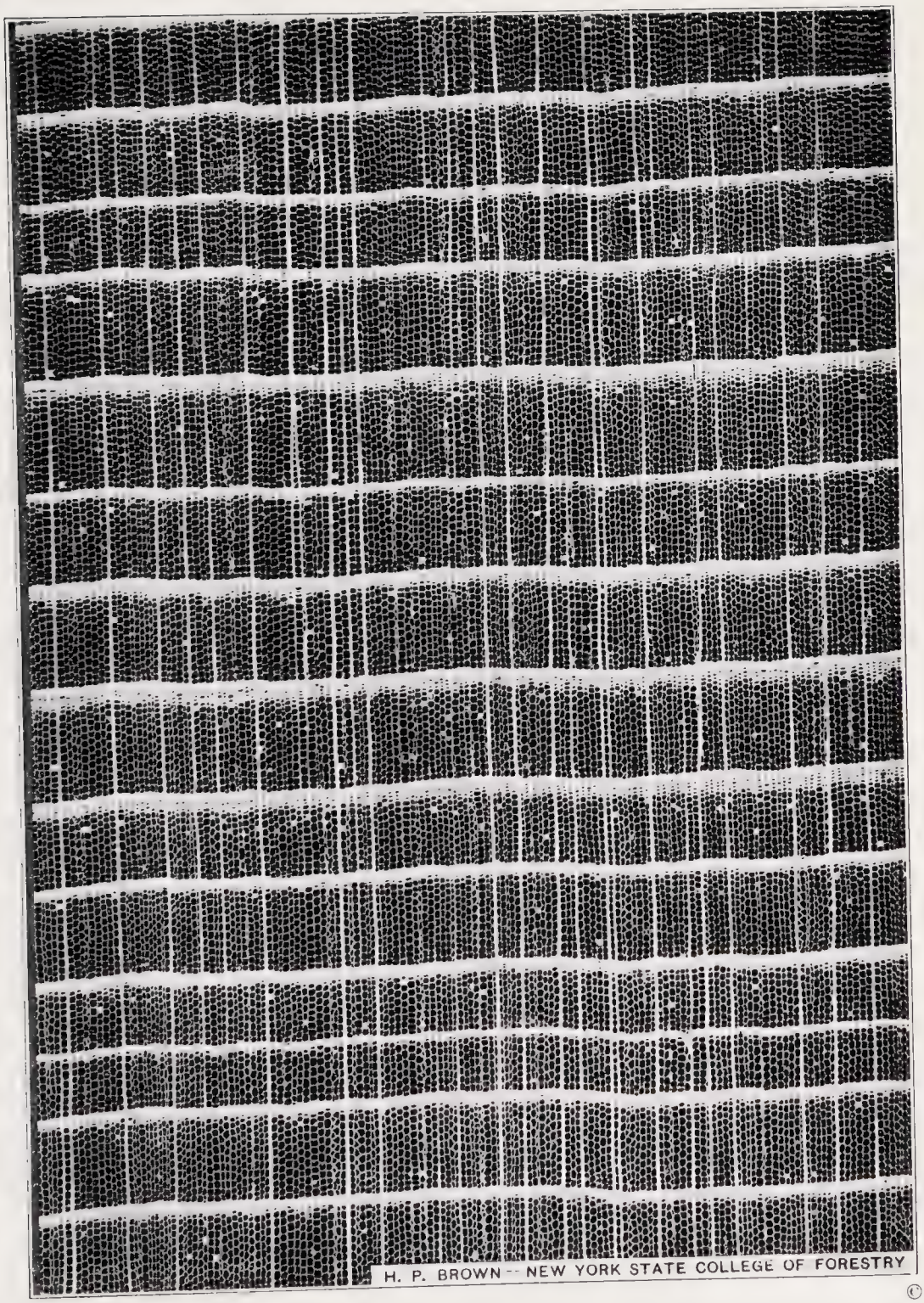
(X—15 diameters)



White Fir

Abies concolor Lindl. et Gord.

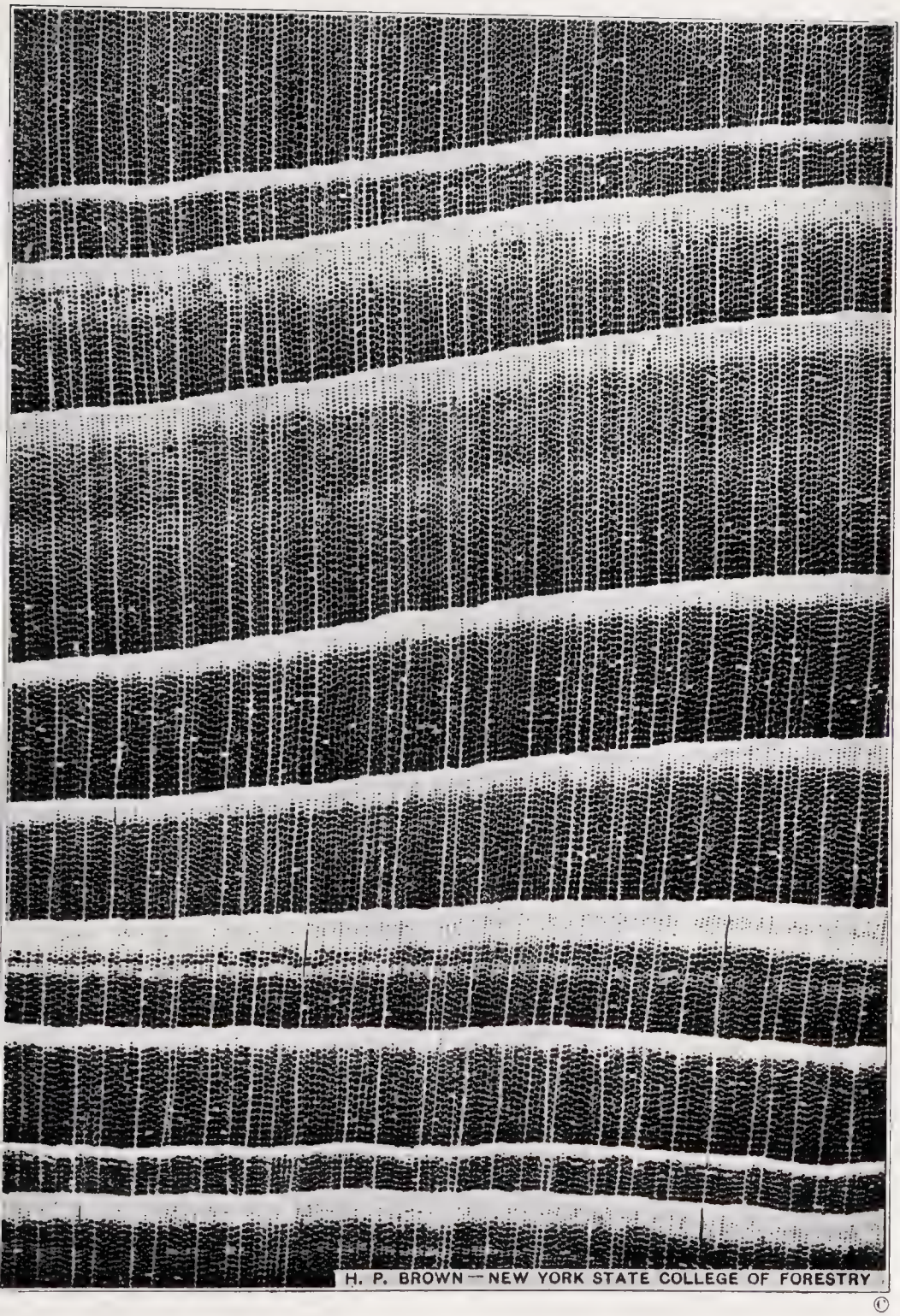
(X—15 diameters)



Redwood

Sequoia sempervirens Endl.

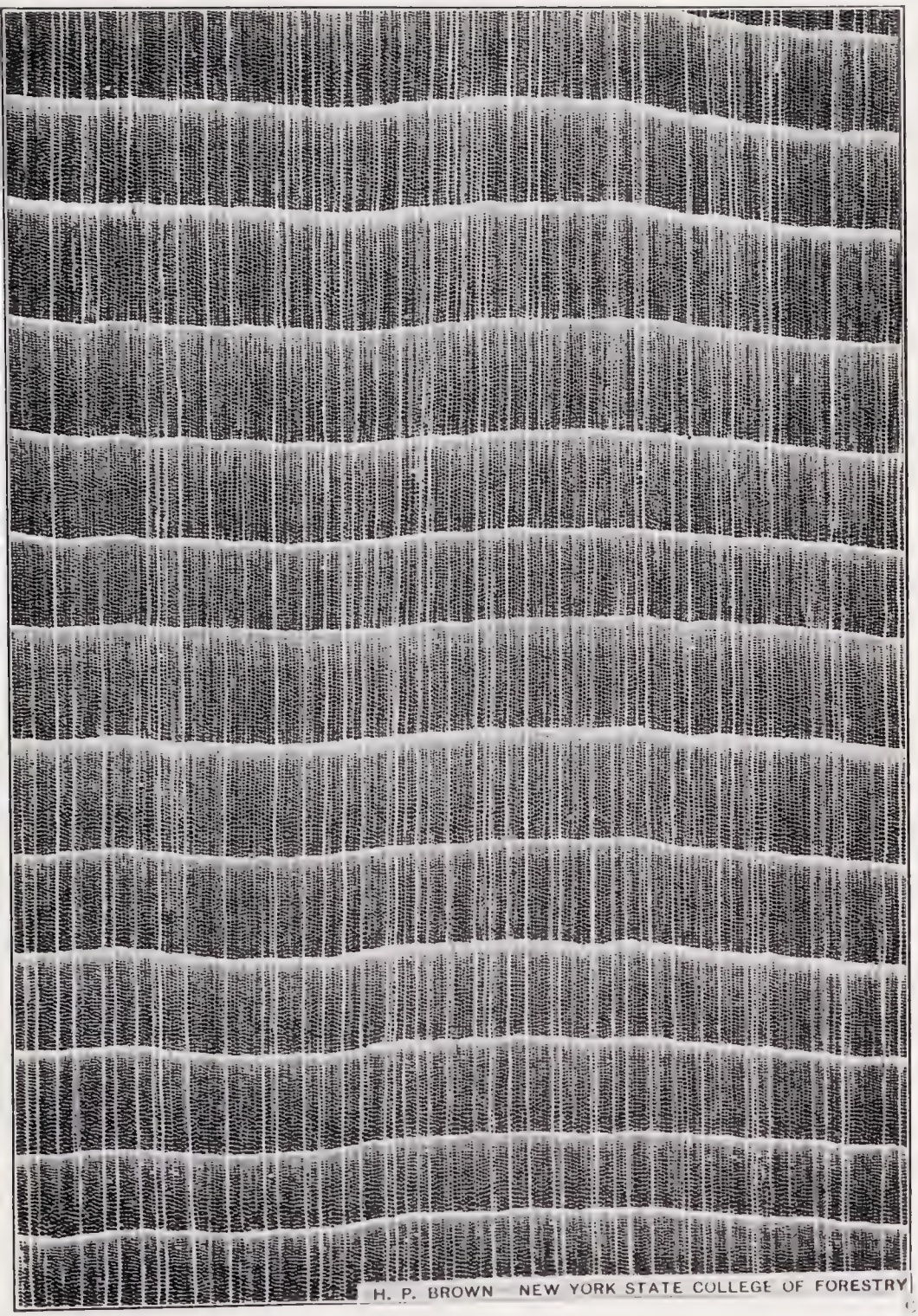
(X—15 diameters)



Bald Cypress, Southern Cypress

Taxodium distichum Rich.

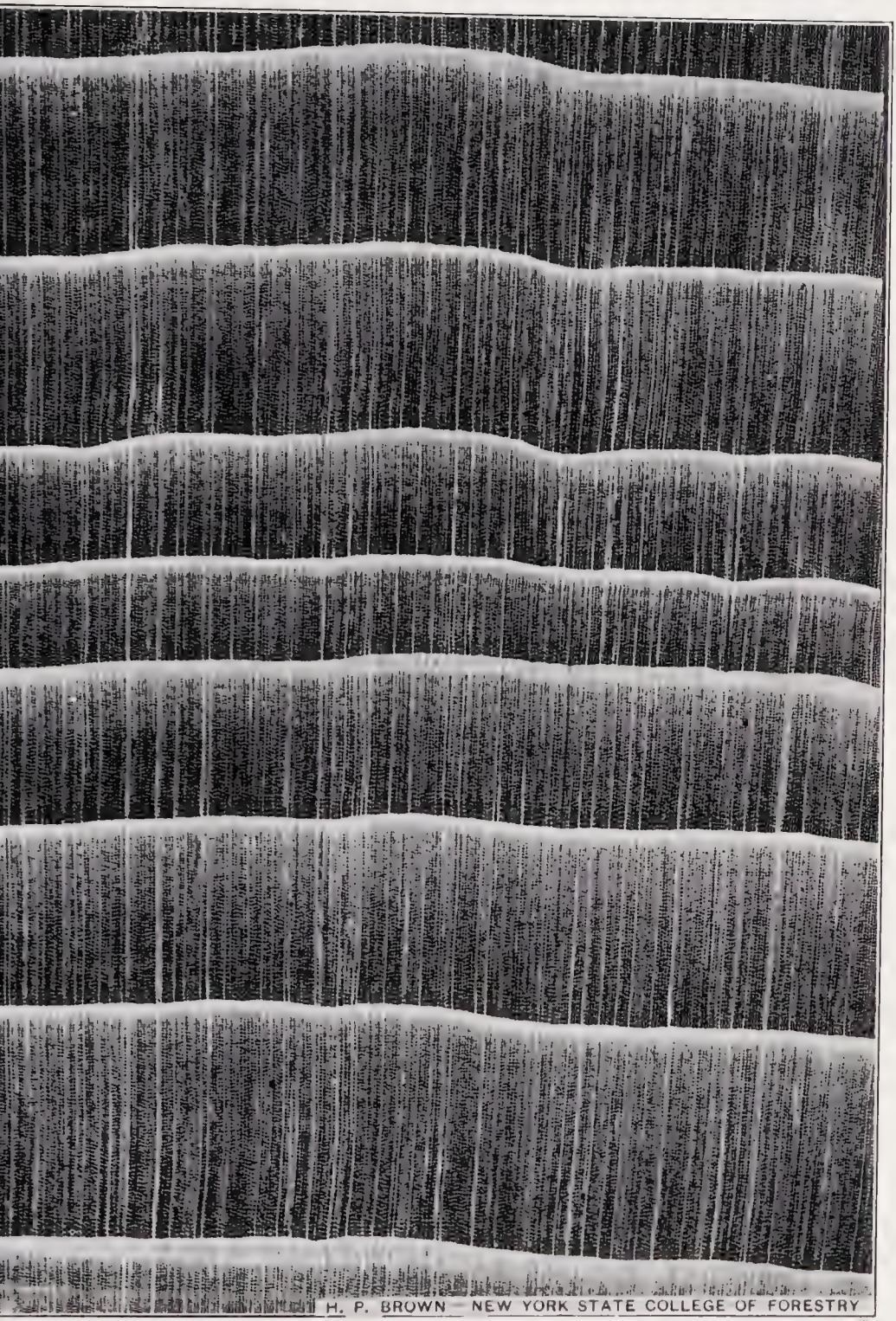
(X—15 diameters)



Incense Cedar

Libocedrus decurrens Torr.

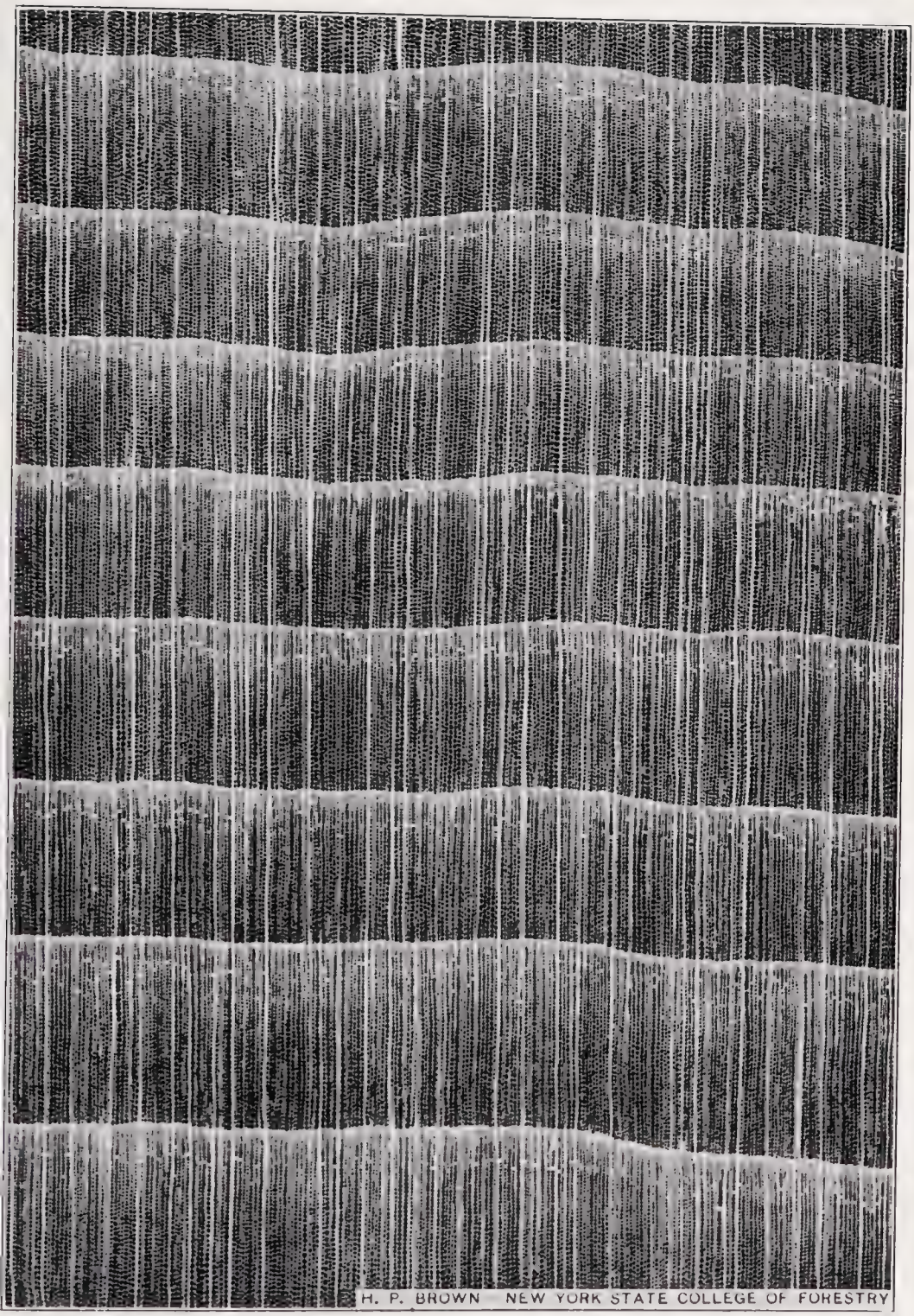
(X—15 diameters)



Northern White Cedar, Arbor-vitae

Thuya occidentalis L.

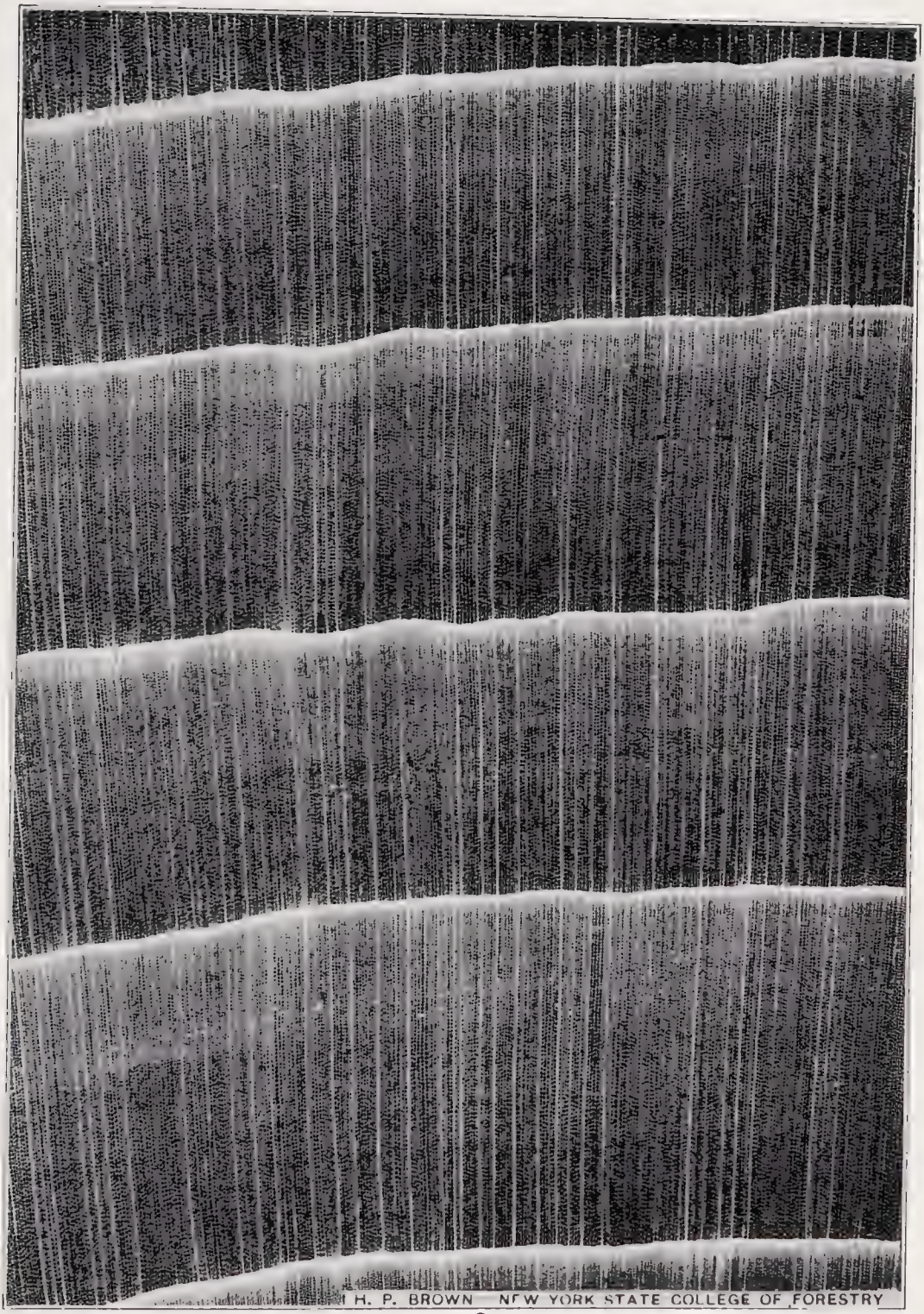
(X—15 diameters)



Western Red Cedar

Thuya plicata D. Don.

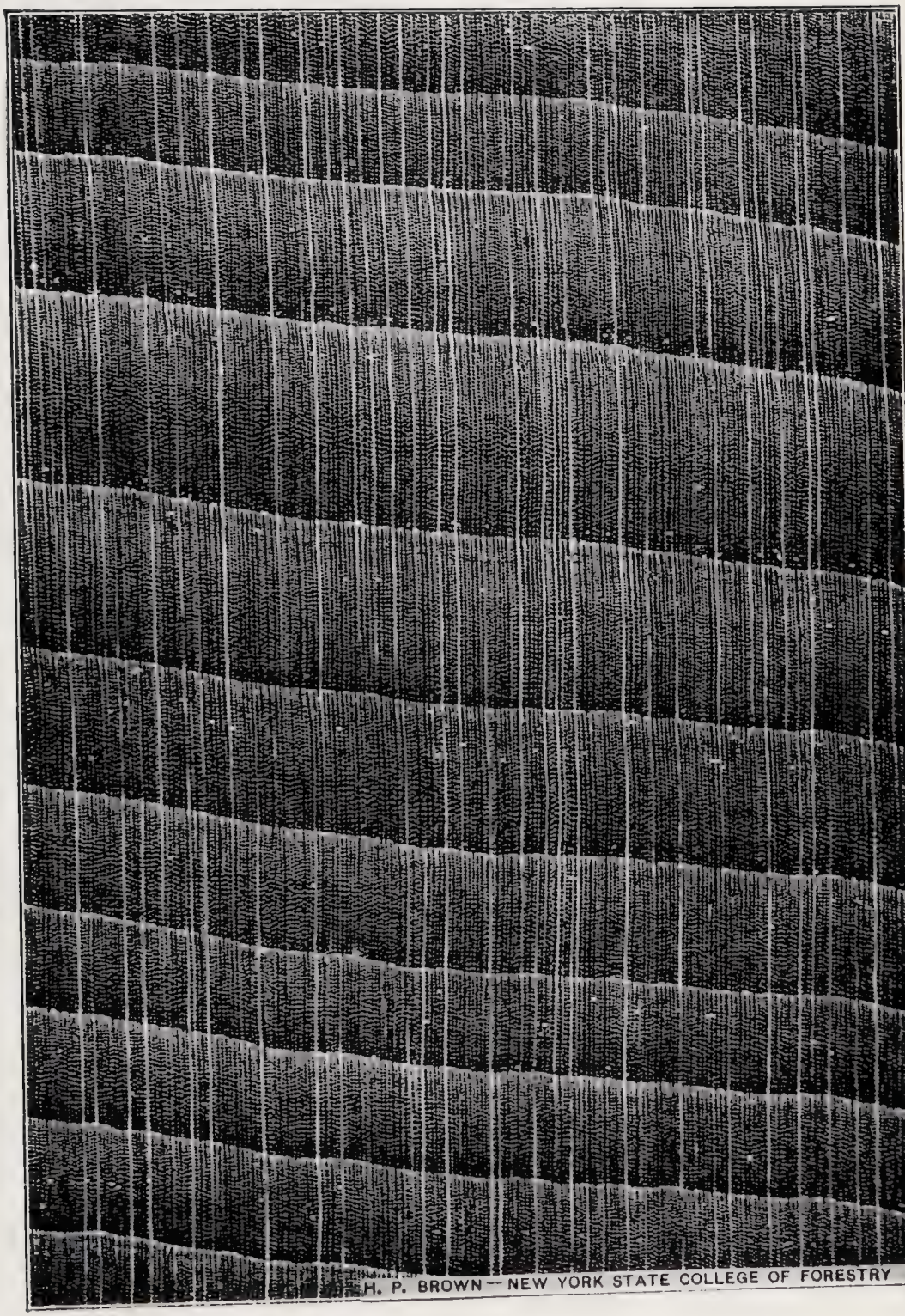
(X—15 diameters)



Southern White Cedar

Chamaecyparis thyoides B.S.P.

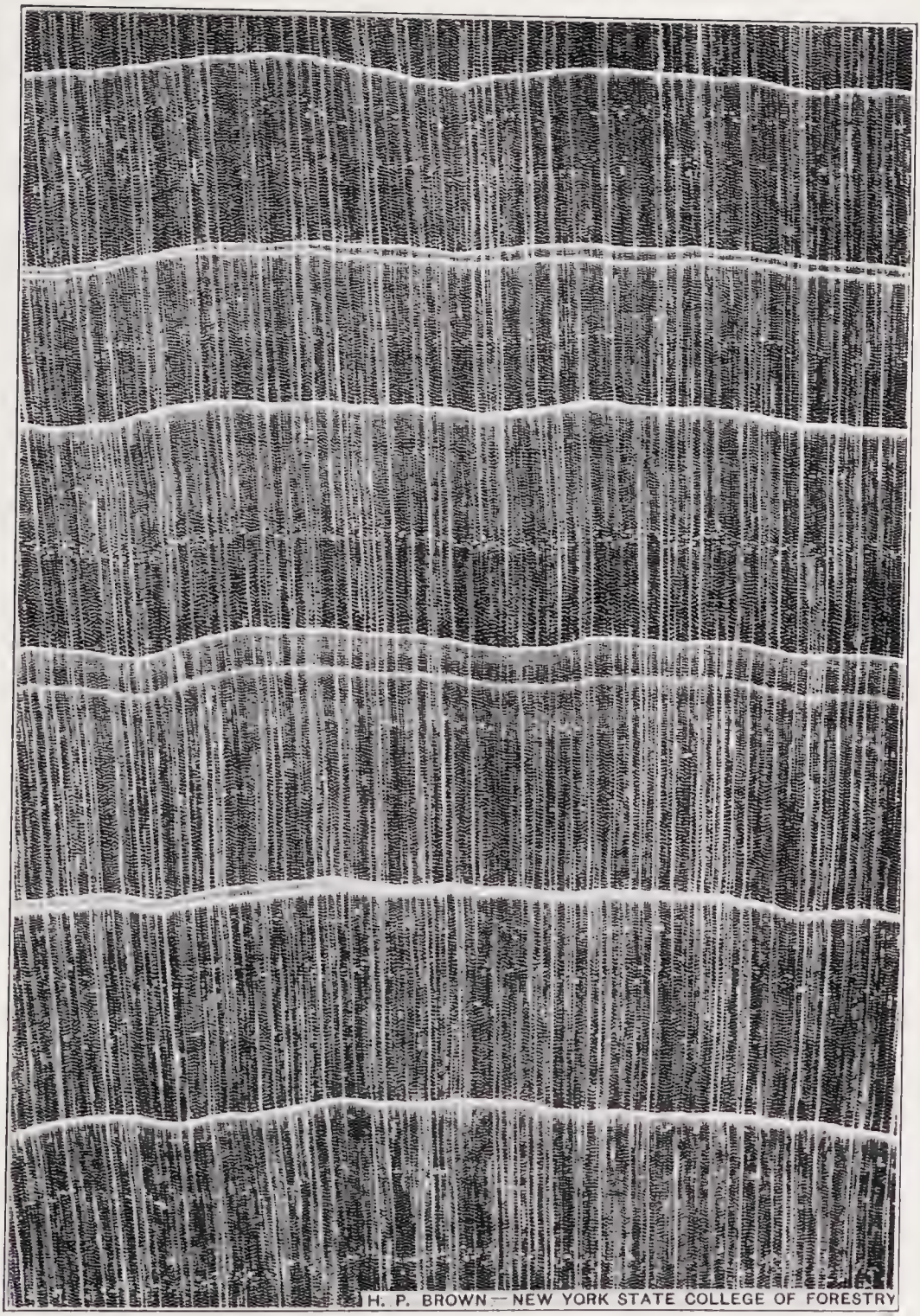
(X—15 diameters)



Port Orford Cedar

Chamaecyparis Lawsoniana Parl.

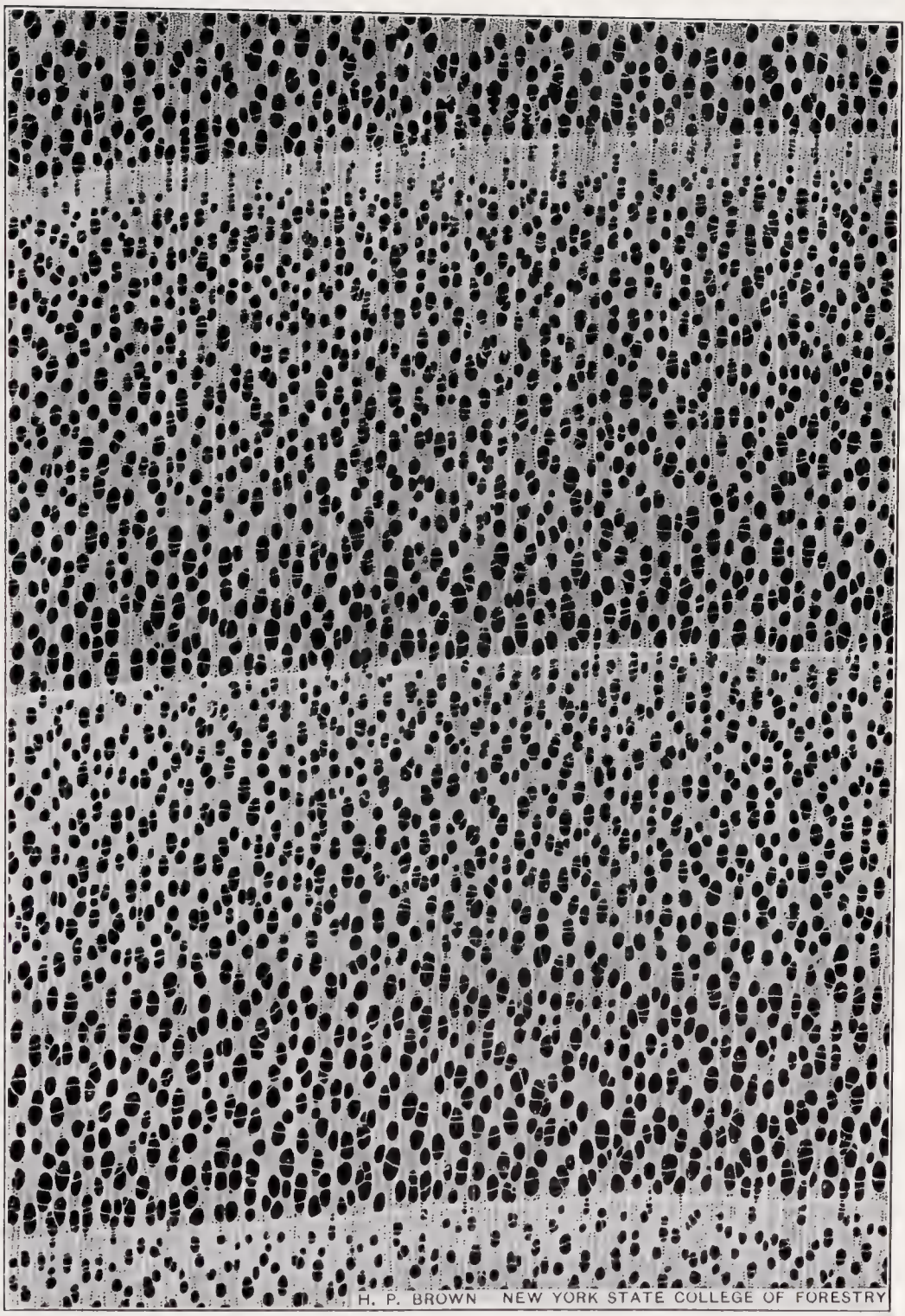
(X—15 diameters)



Red Cedar, Eastern Red Cedar

Juniperus virginiana L.

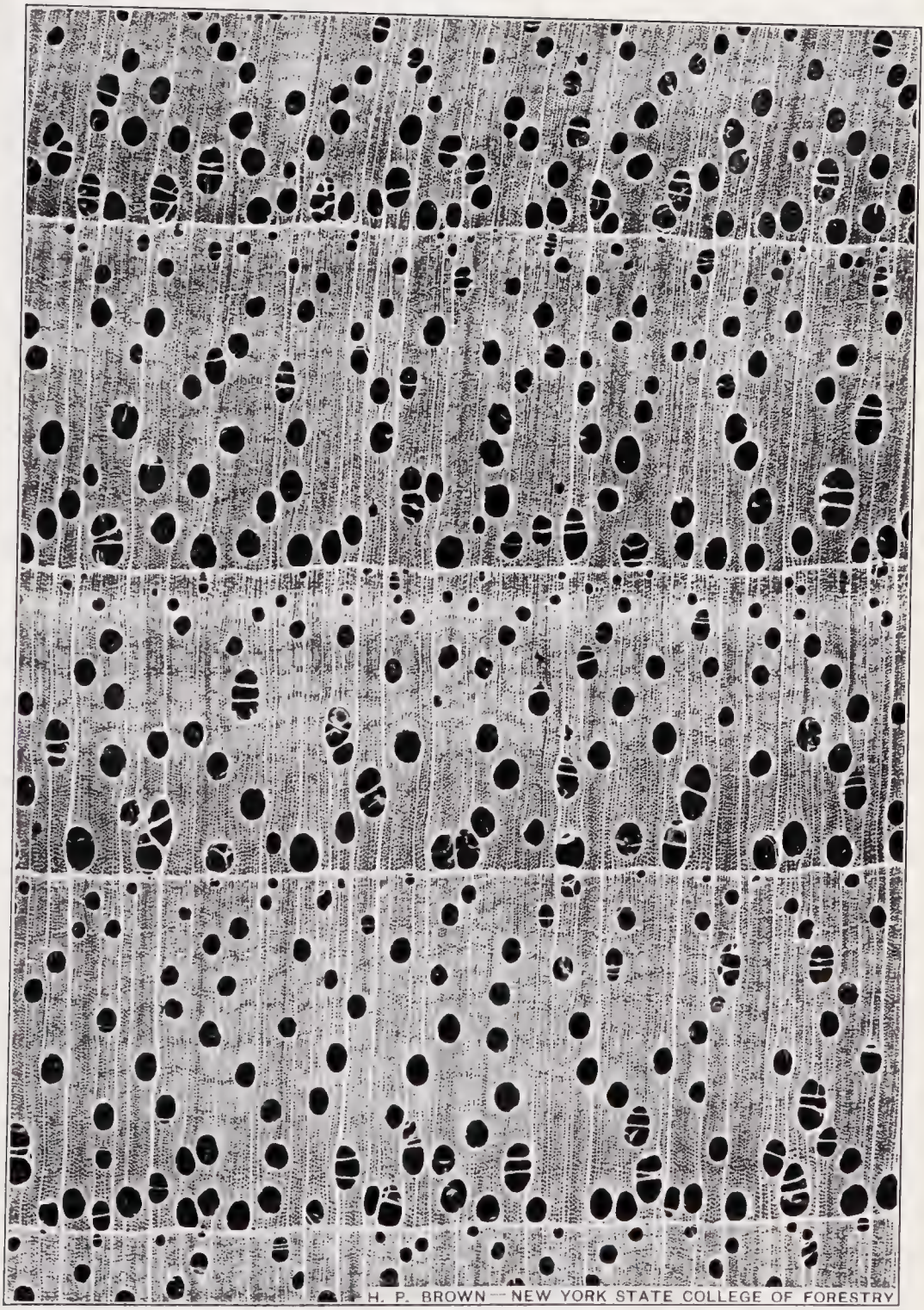
(X—15 diameters)



Cottonwood, Eastern Cottonwood

Populus balsamifera var. virginiana Sarg.; Populus deltoides Marsh.

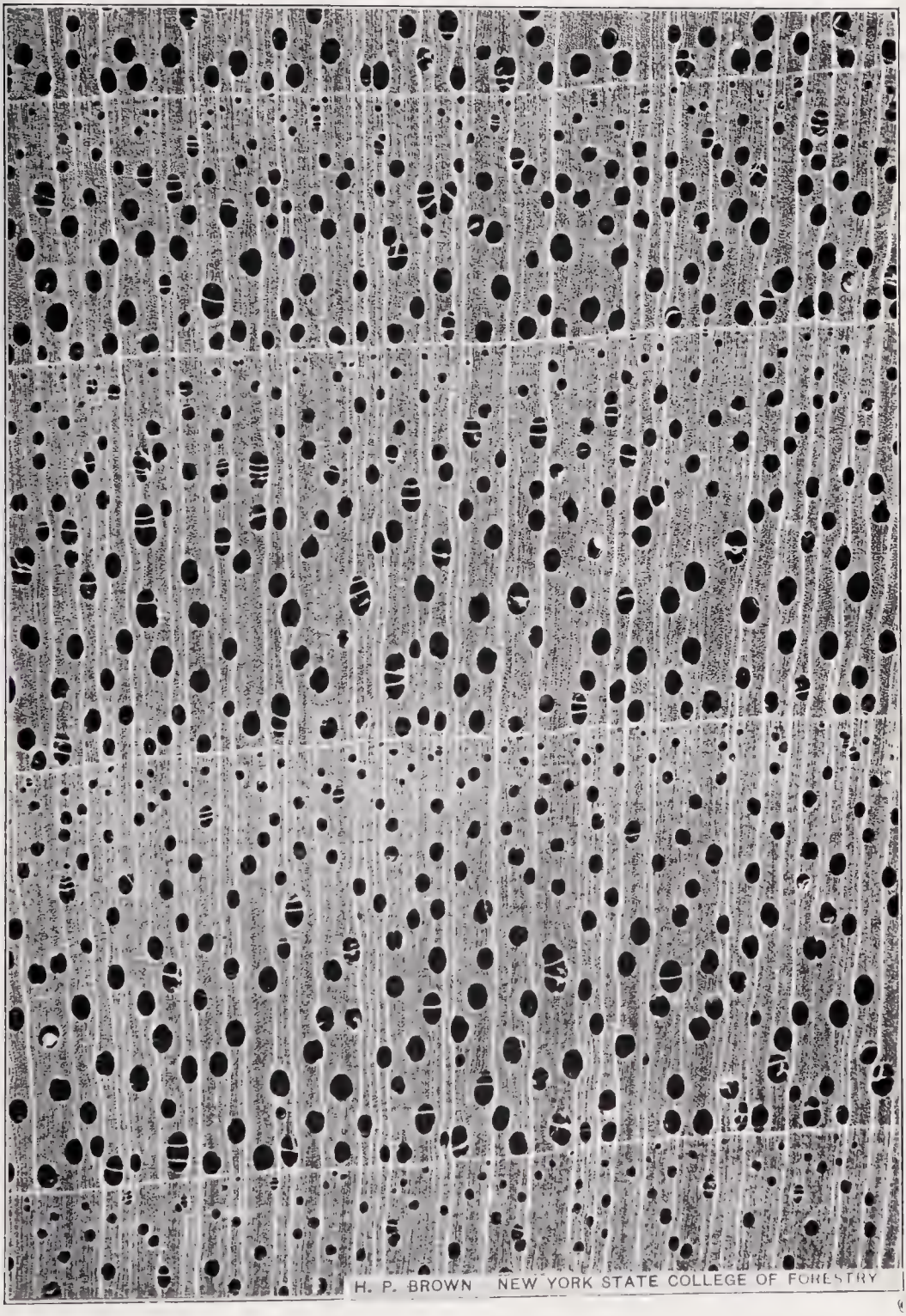
(X—15 diameters)



Butternut

Juglans cinerea L.

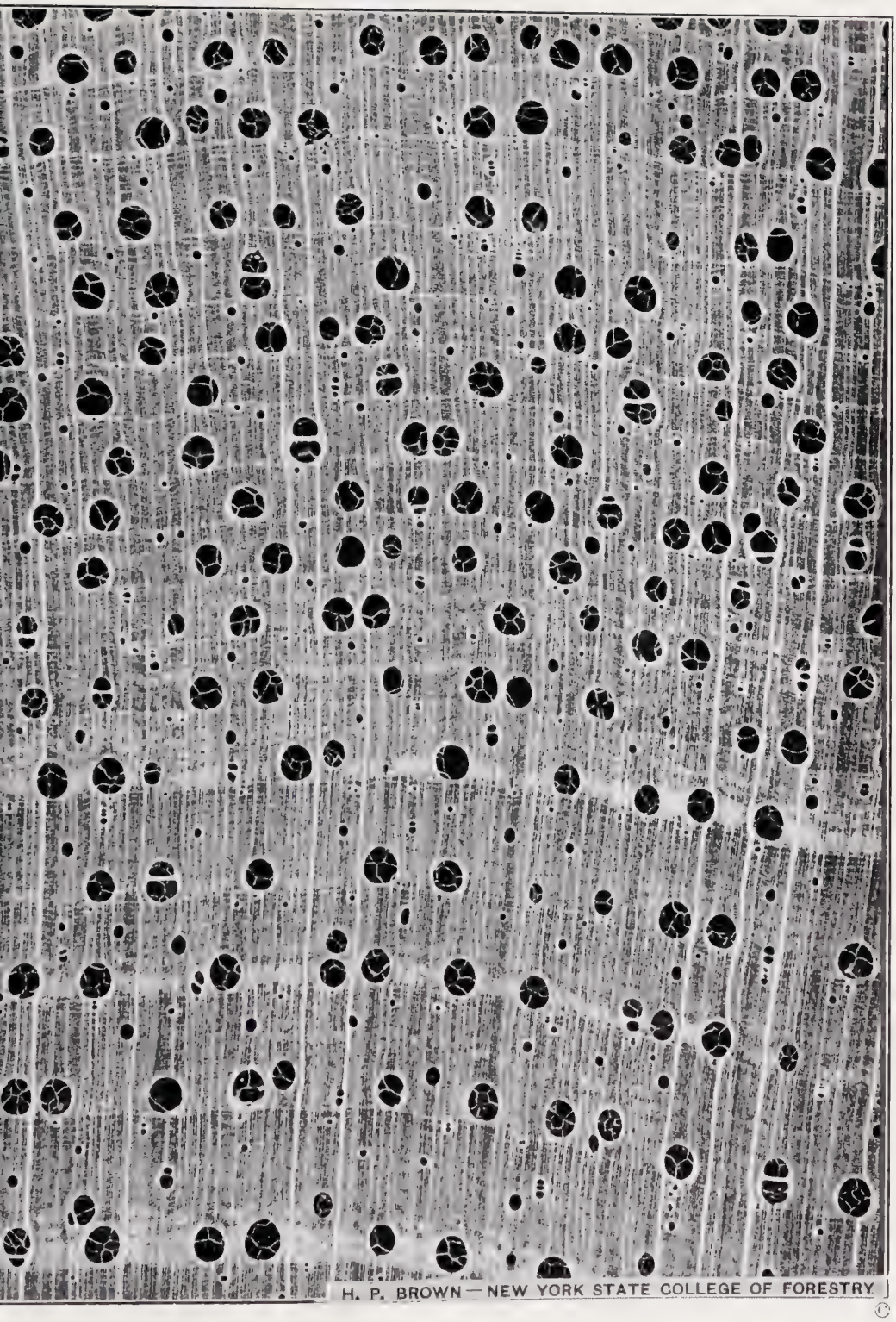
(X—15 diameters)



Black Walnut

Juglans nigra L.

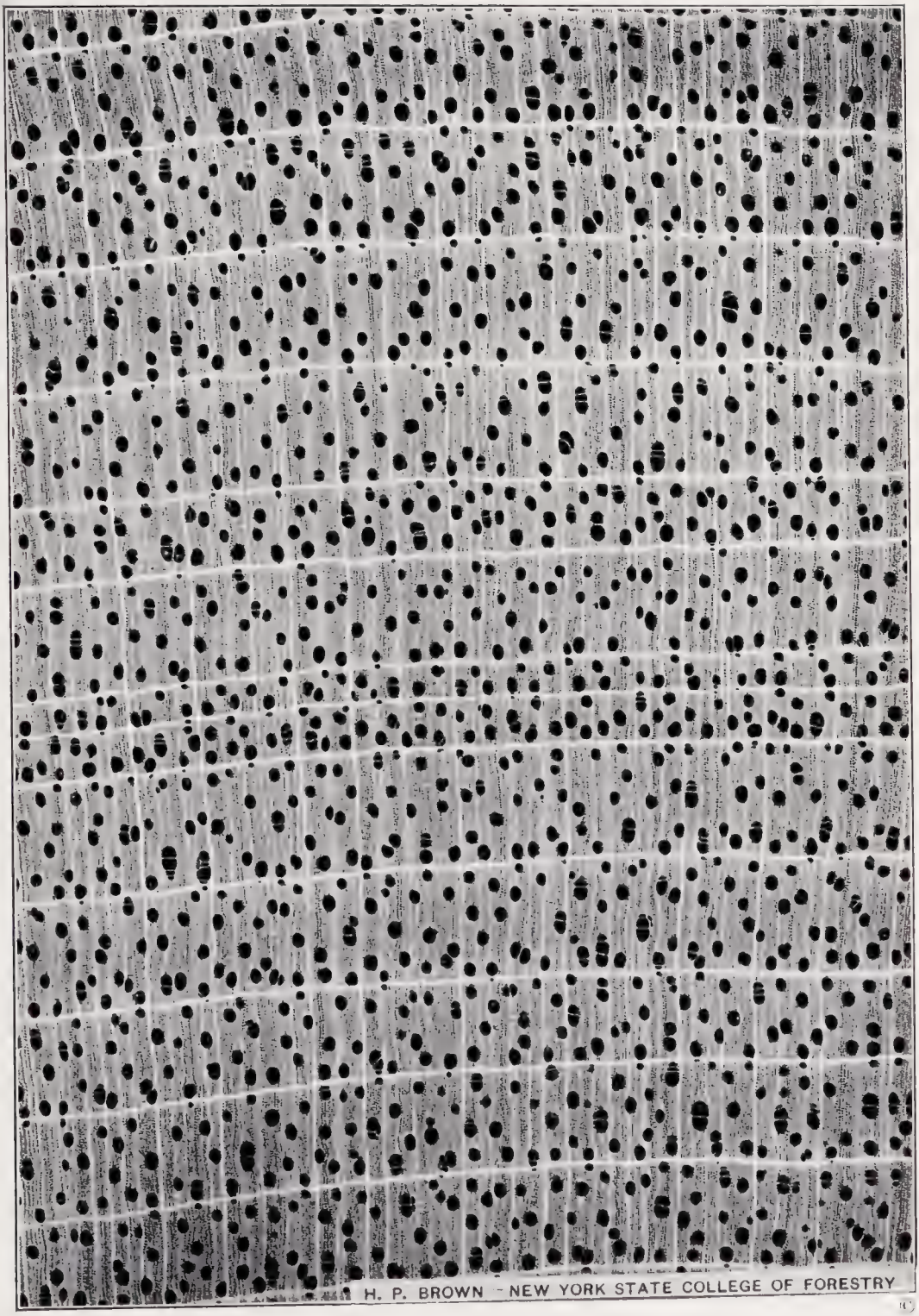
(X—15 diameters)



Pignut, Pignut Hickory

Carya glabra Sweet.; Hicoria glabra (Miller) Sweet.

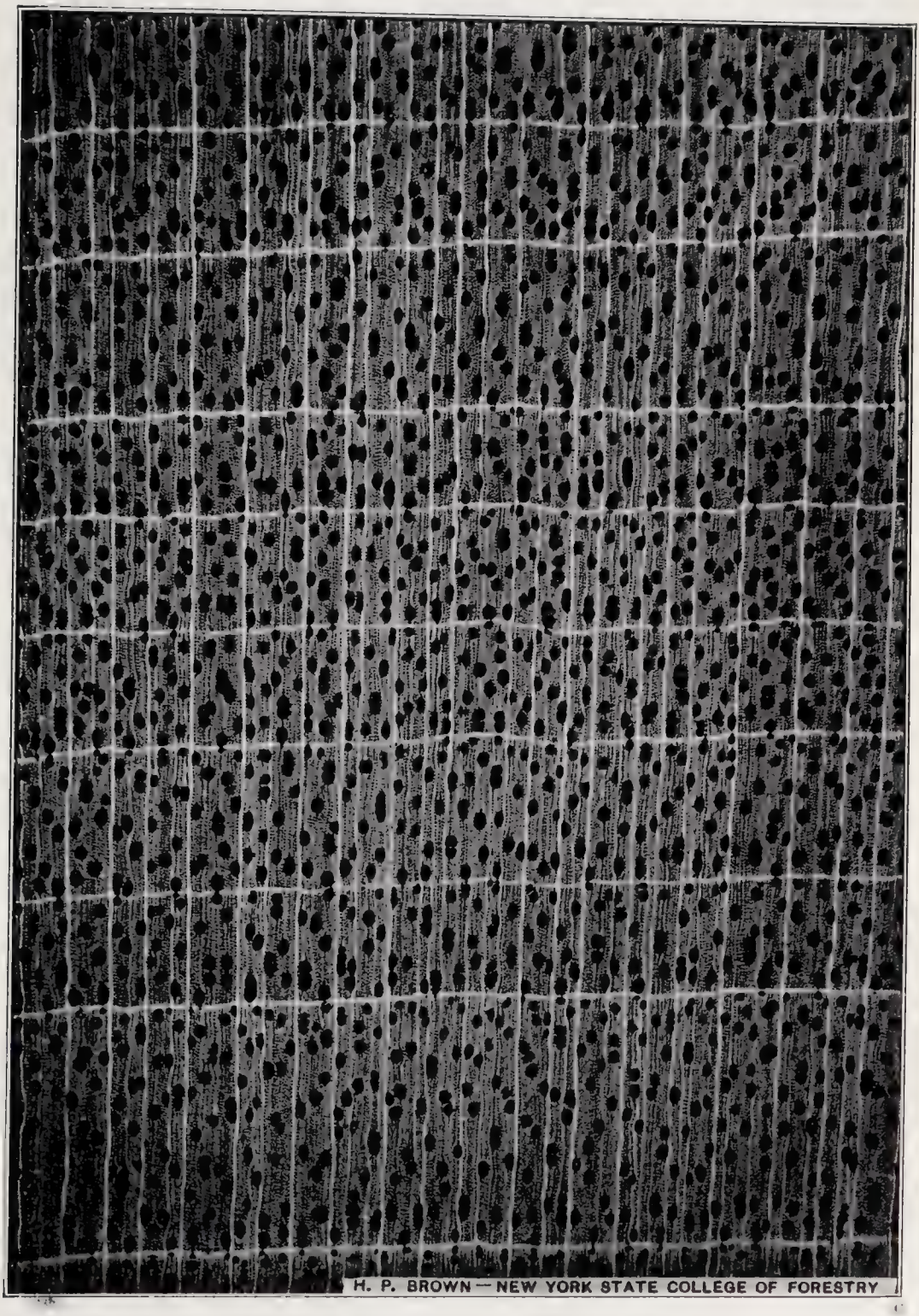
(X—15 diameters)



Yellow Birch

Betula lutea Michx.

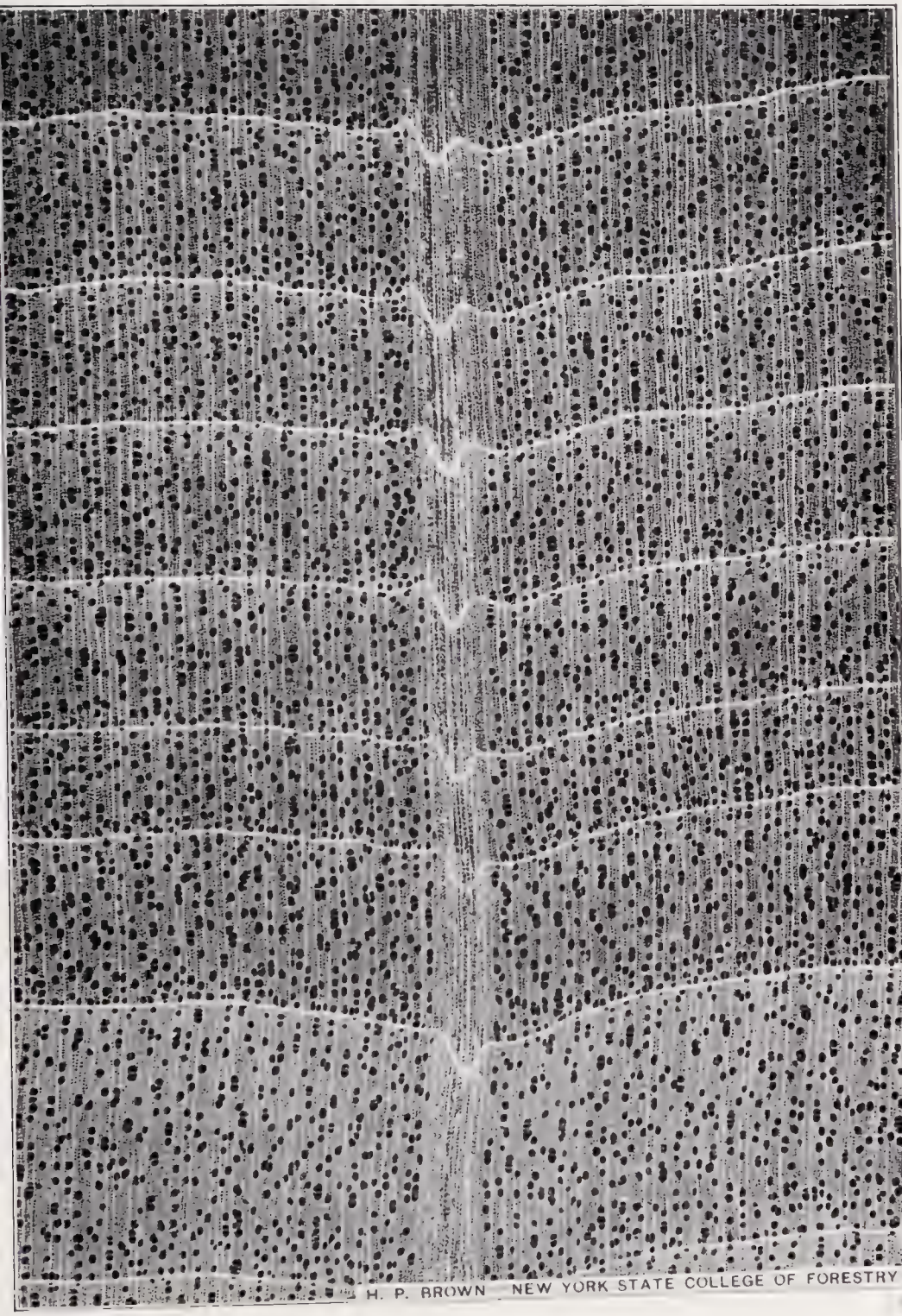
(X—15 diameters)



Paper Birch

Betula papyrifera Marsh.

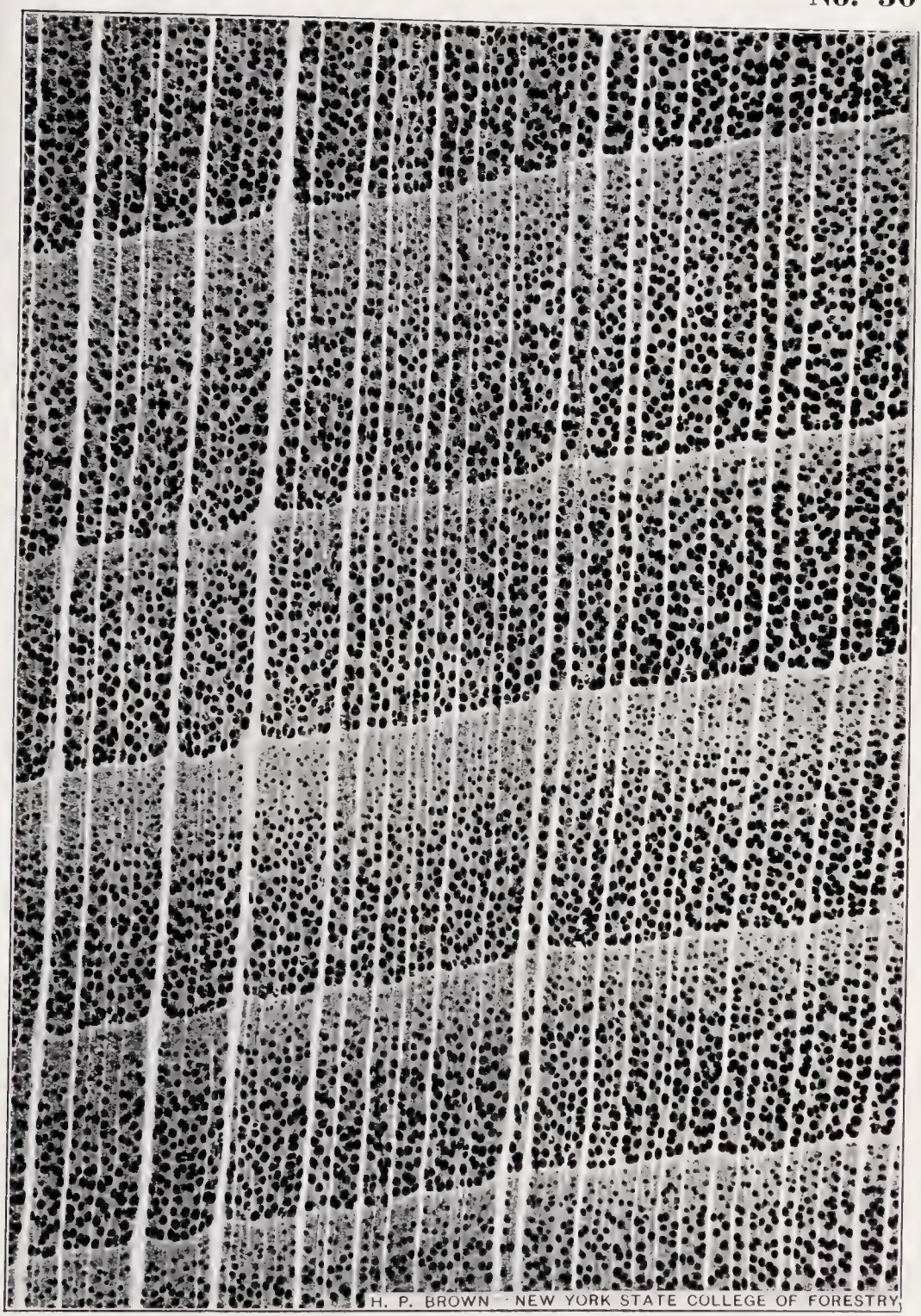
(X—15 diameters)



Red Alder

Alnus rubra Bong.

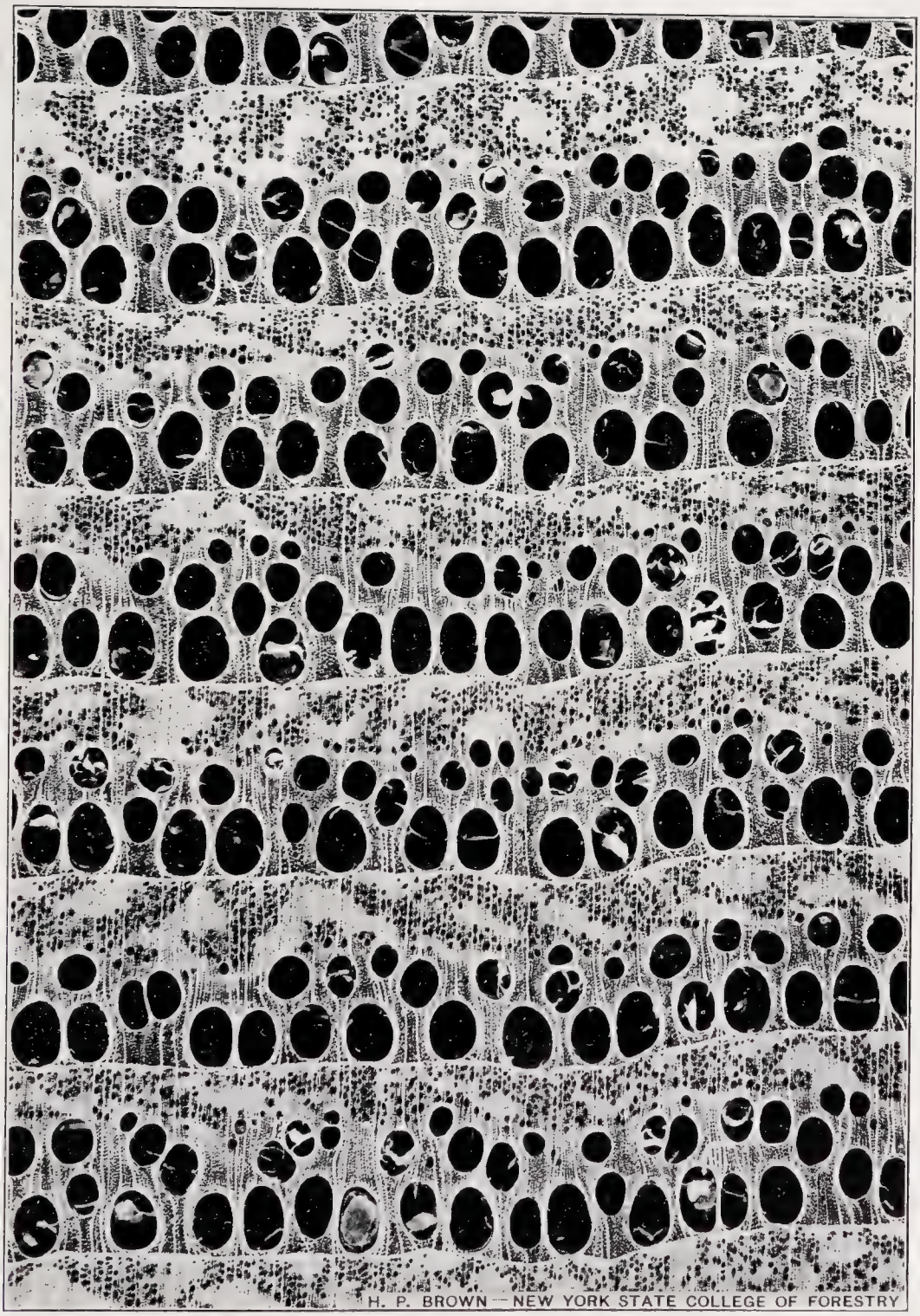
(X—15 diameters)



Beech

Fagus grandifolia Ehrh.

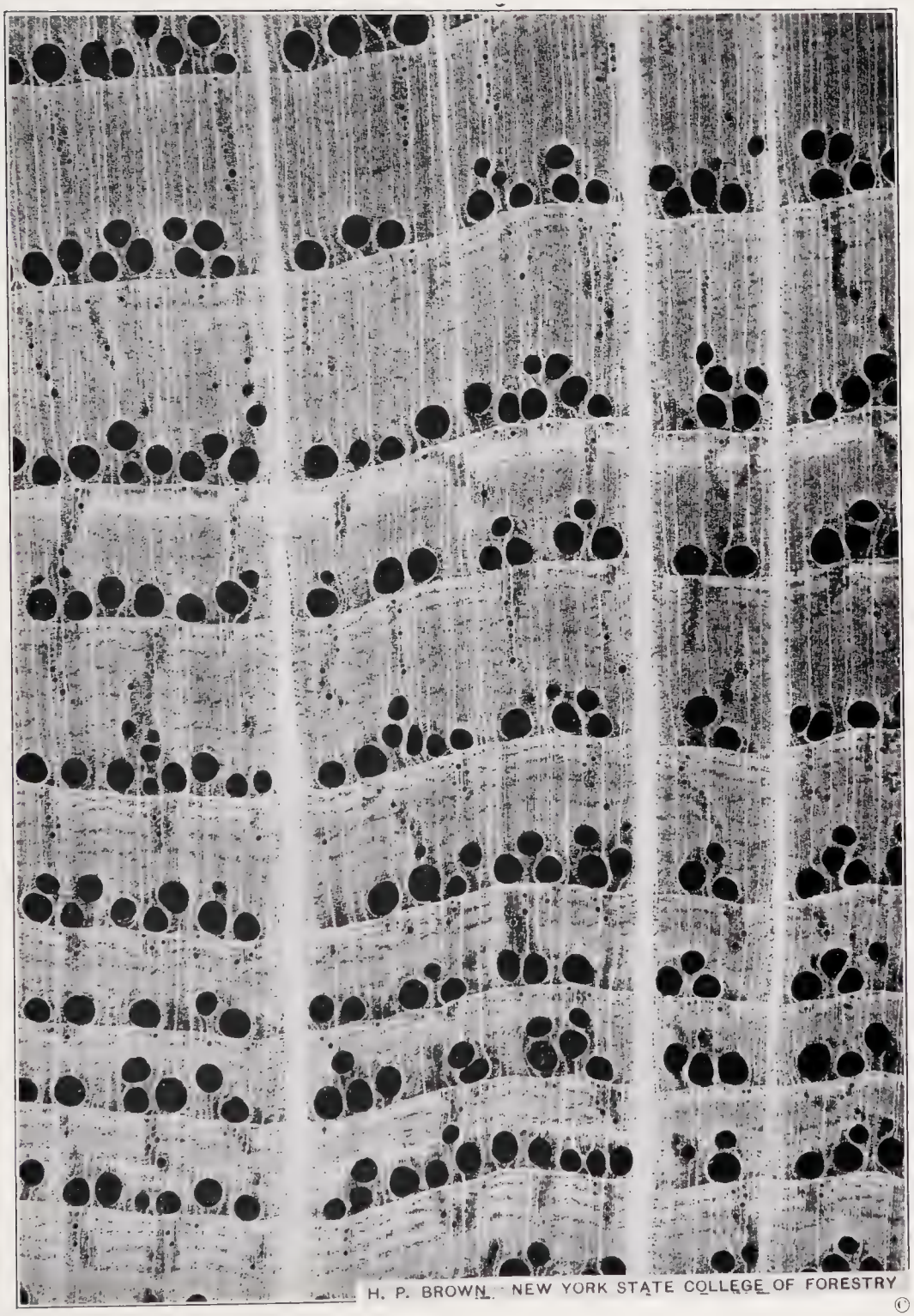
(X—15 diameters)



Chestnut

Castanea dentata Borkh.

(X—15 diameters)



Red Oak

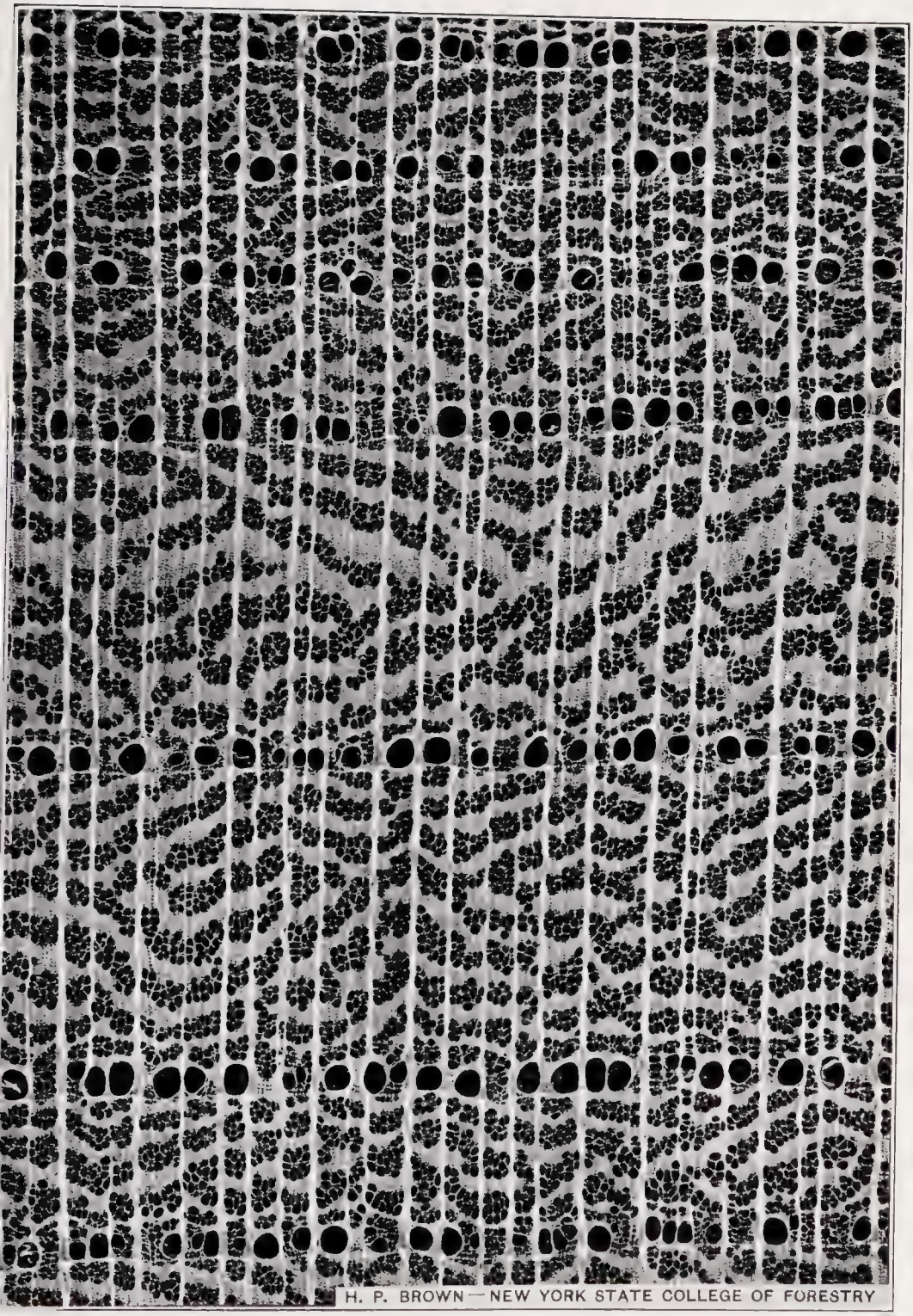
Quercus borealis Michx.

(X—15 diameters)

White Oak

Quercus alba L.

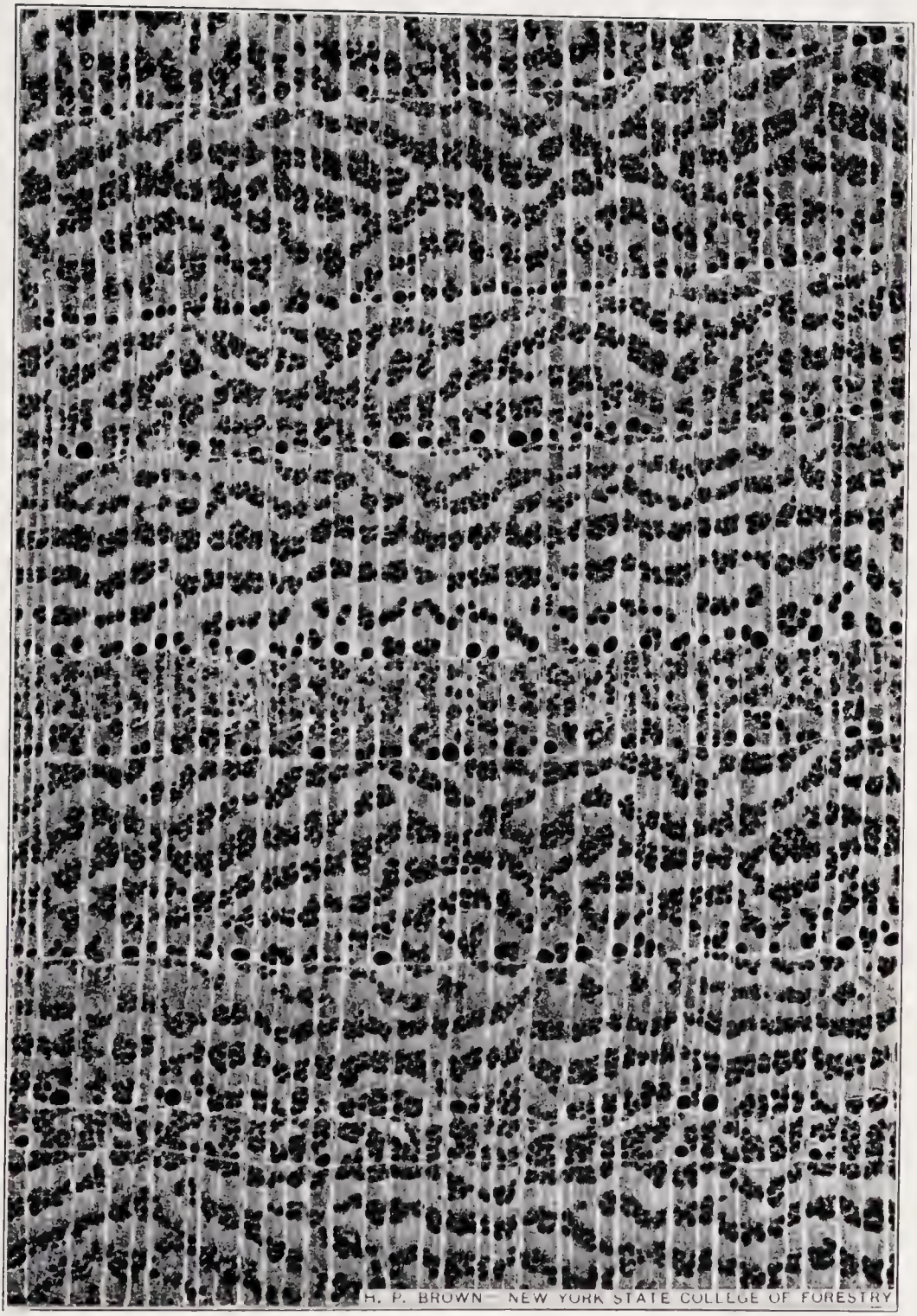
(X—15 diameters)



White Elm, American Elm

Ulmus americana L.

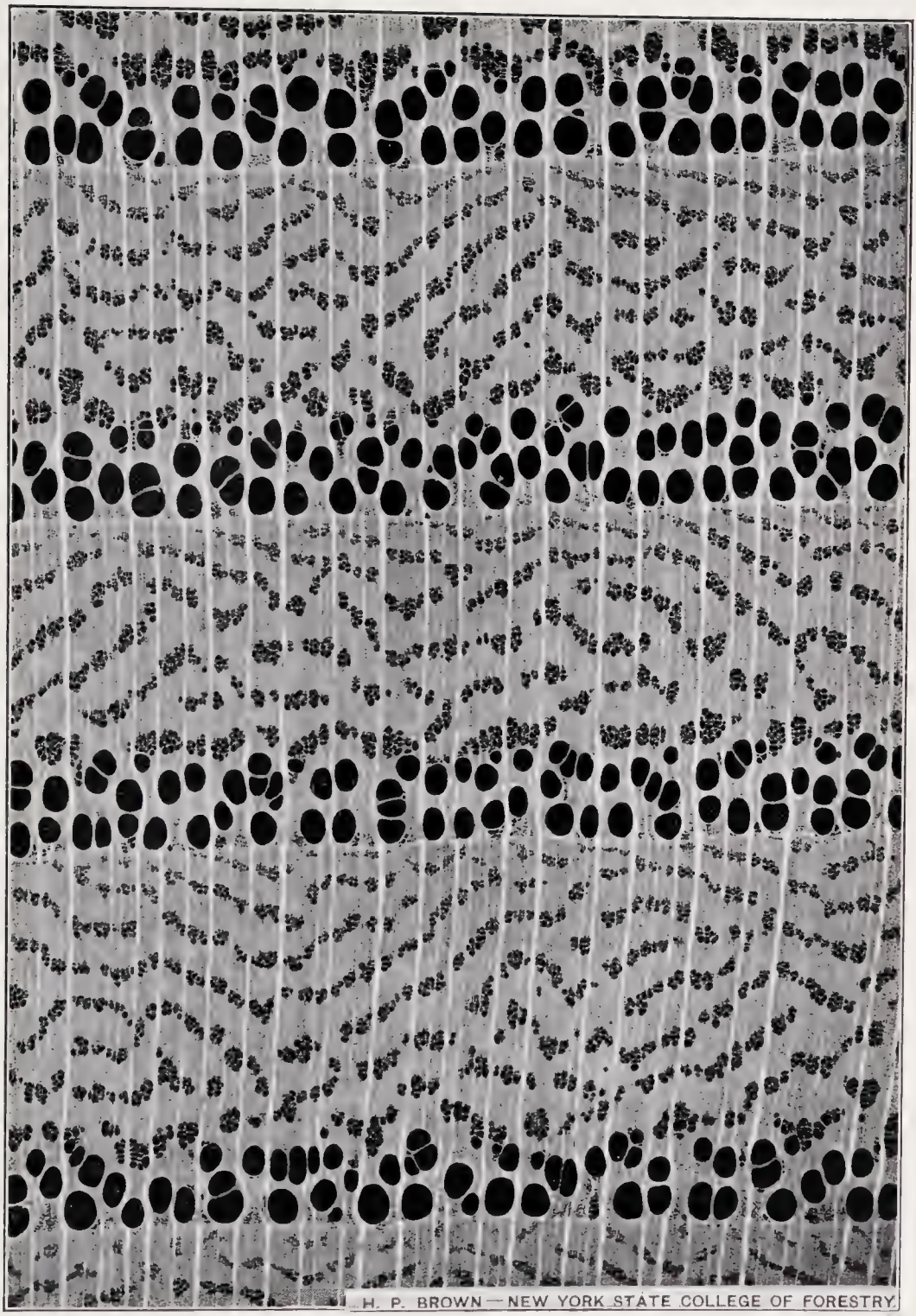
(X—15 diameters)



Rock Elm

Ulmus racemosa Thomas

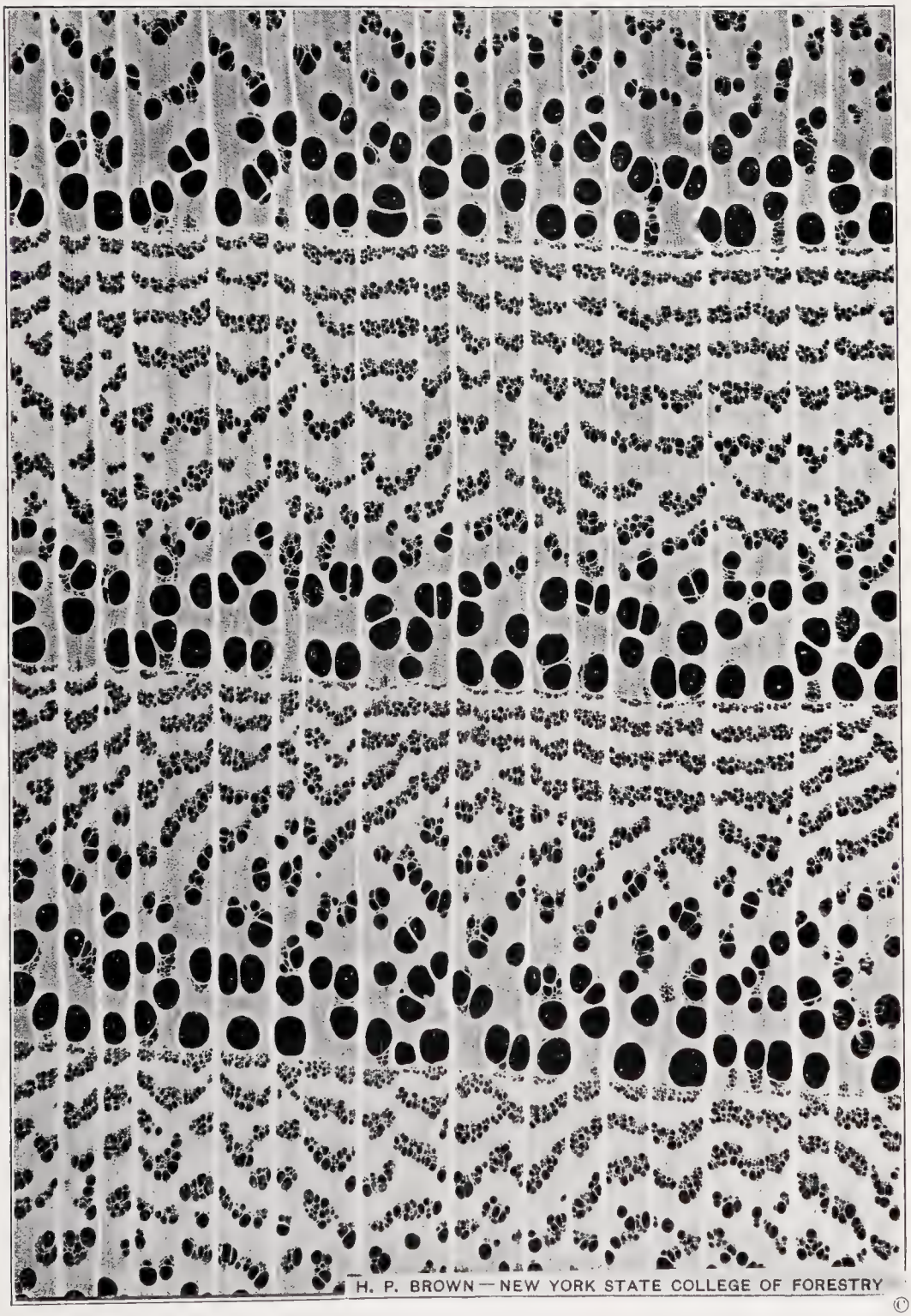
(X—15 diameters)



Slippery Elm, Red Elm

Ulmus fulva Michx.

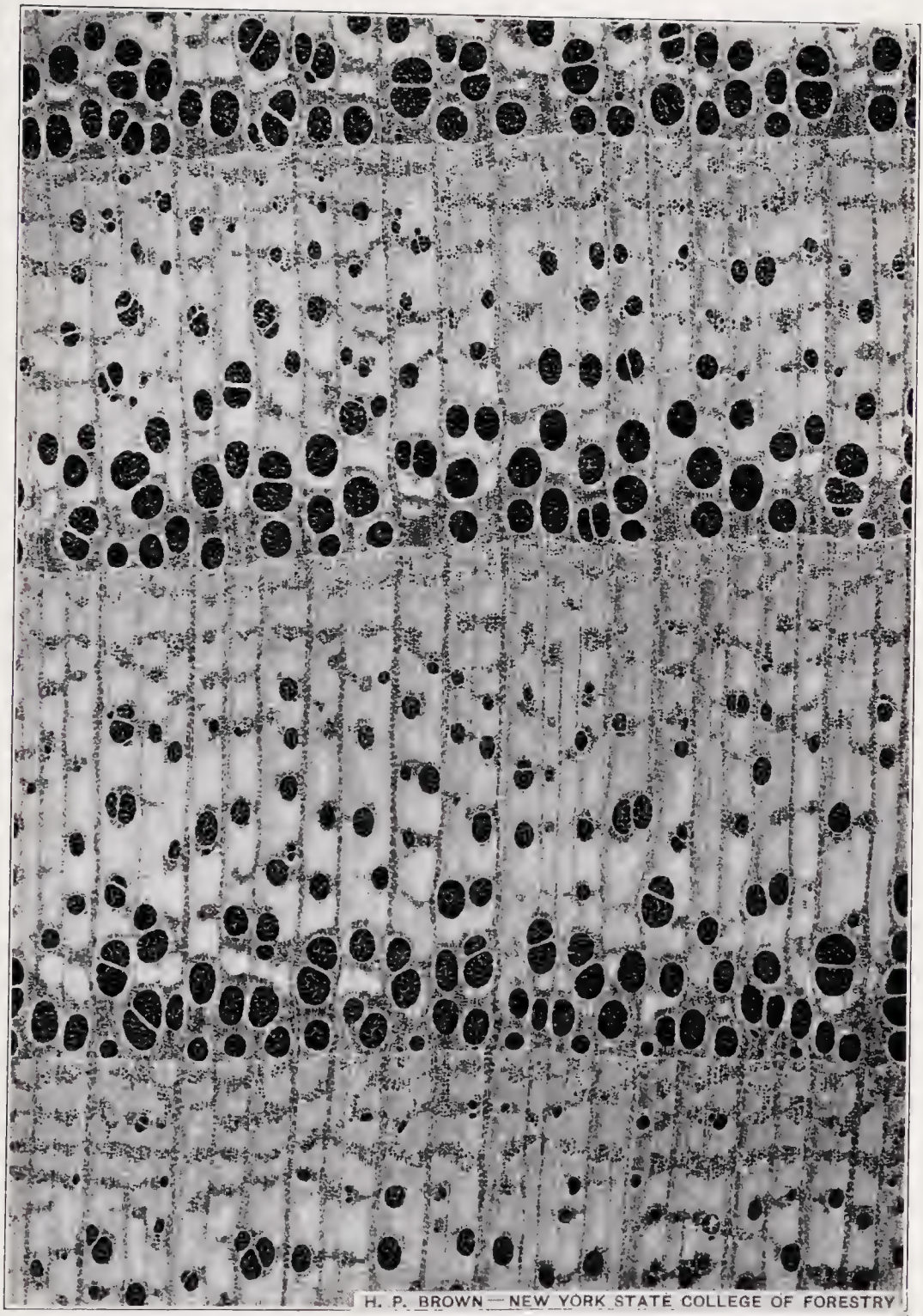
(X—15 diameters)



Hackberry

Celtis occidentalis L.

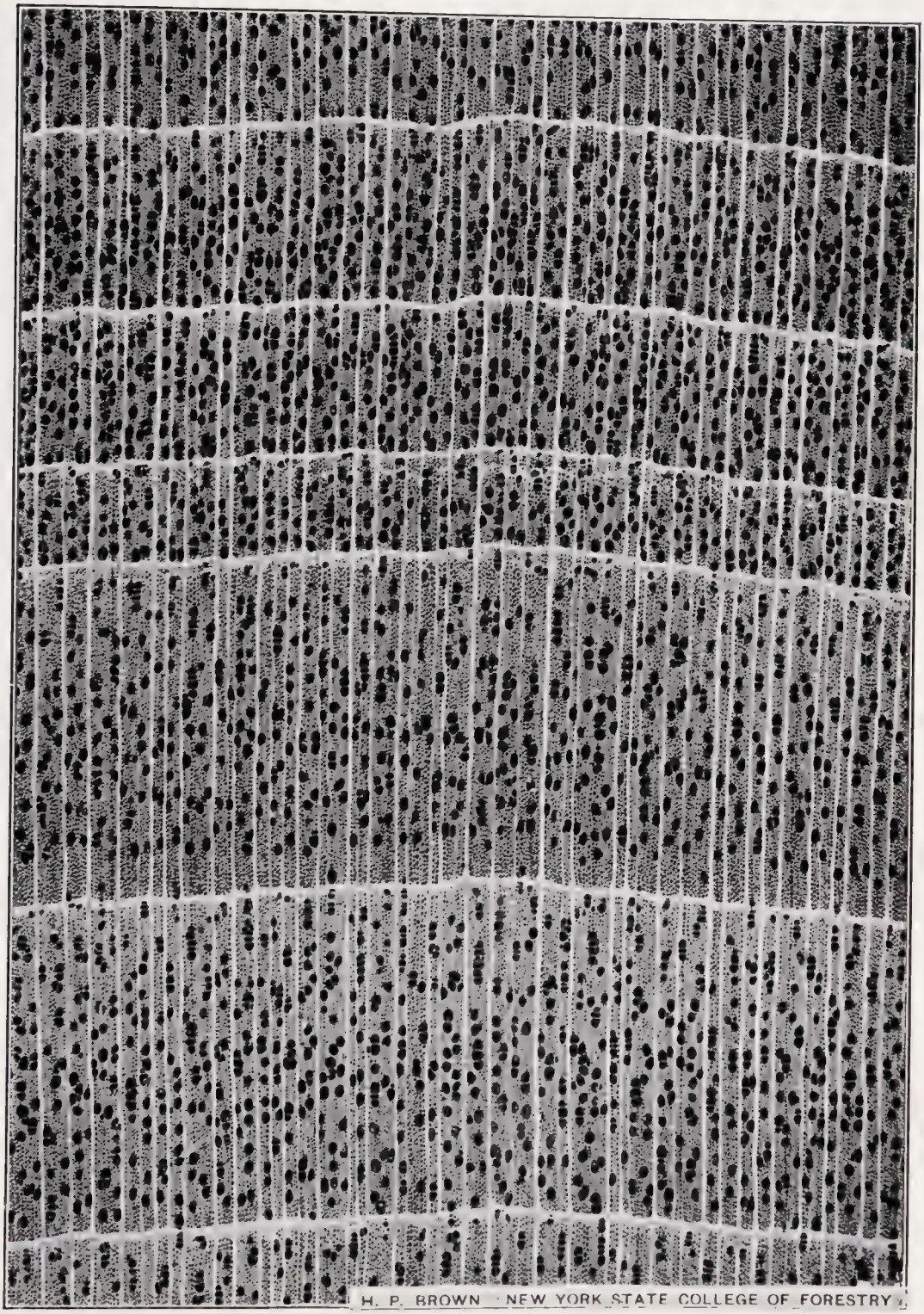
(X—15 diameters)



Osage Orange

Maclura pomifera Schn.; Toxylon pomiferum Rafn.

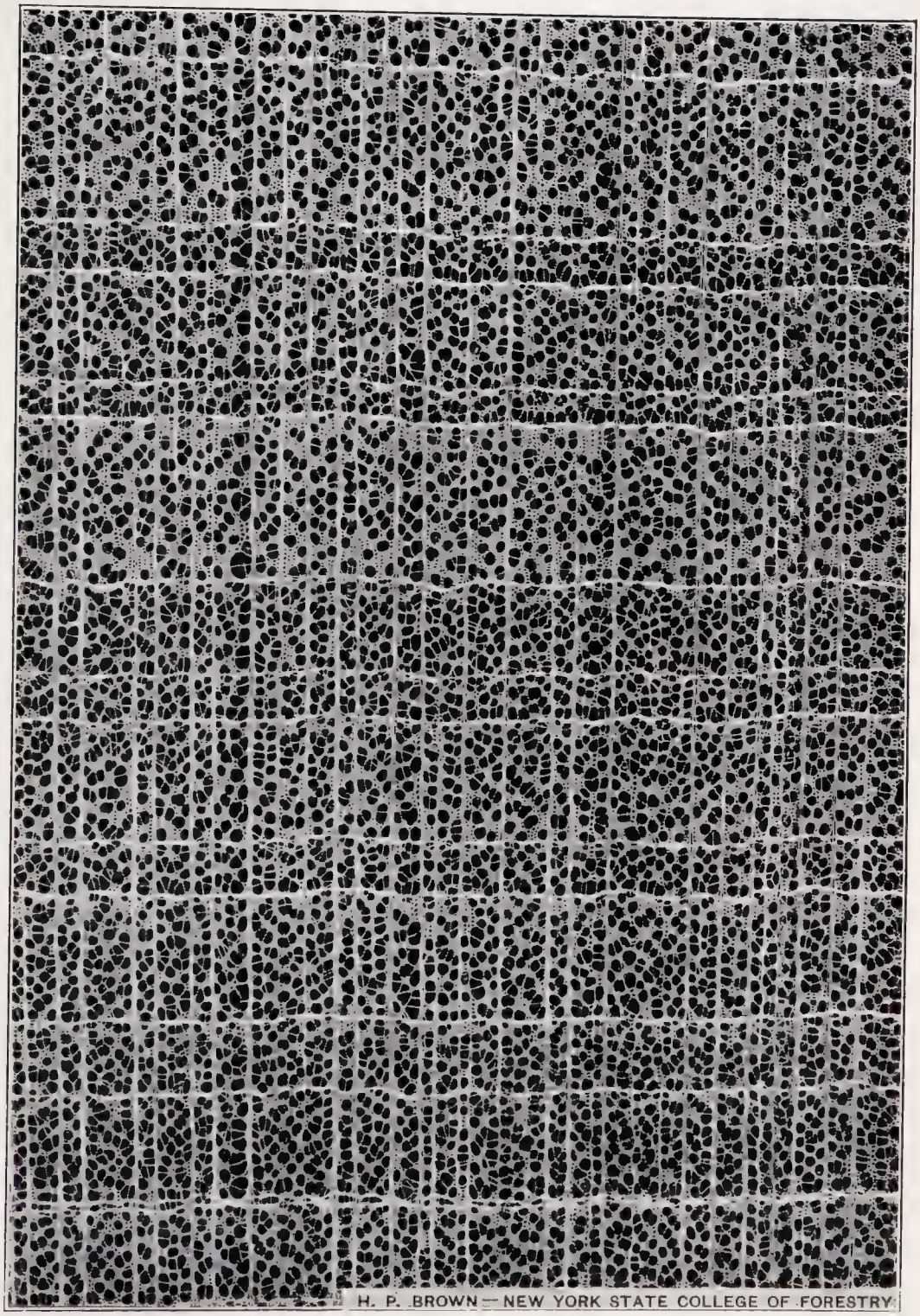
(X—15 diameters)



Cucumber Tree, Cucumber Magnolia

Magnolia acuminata L.

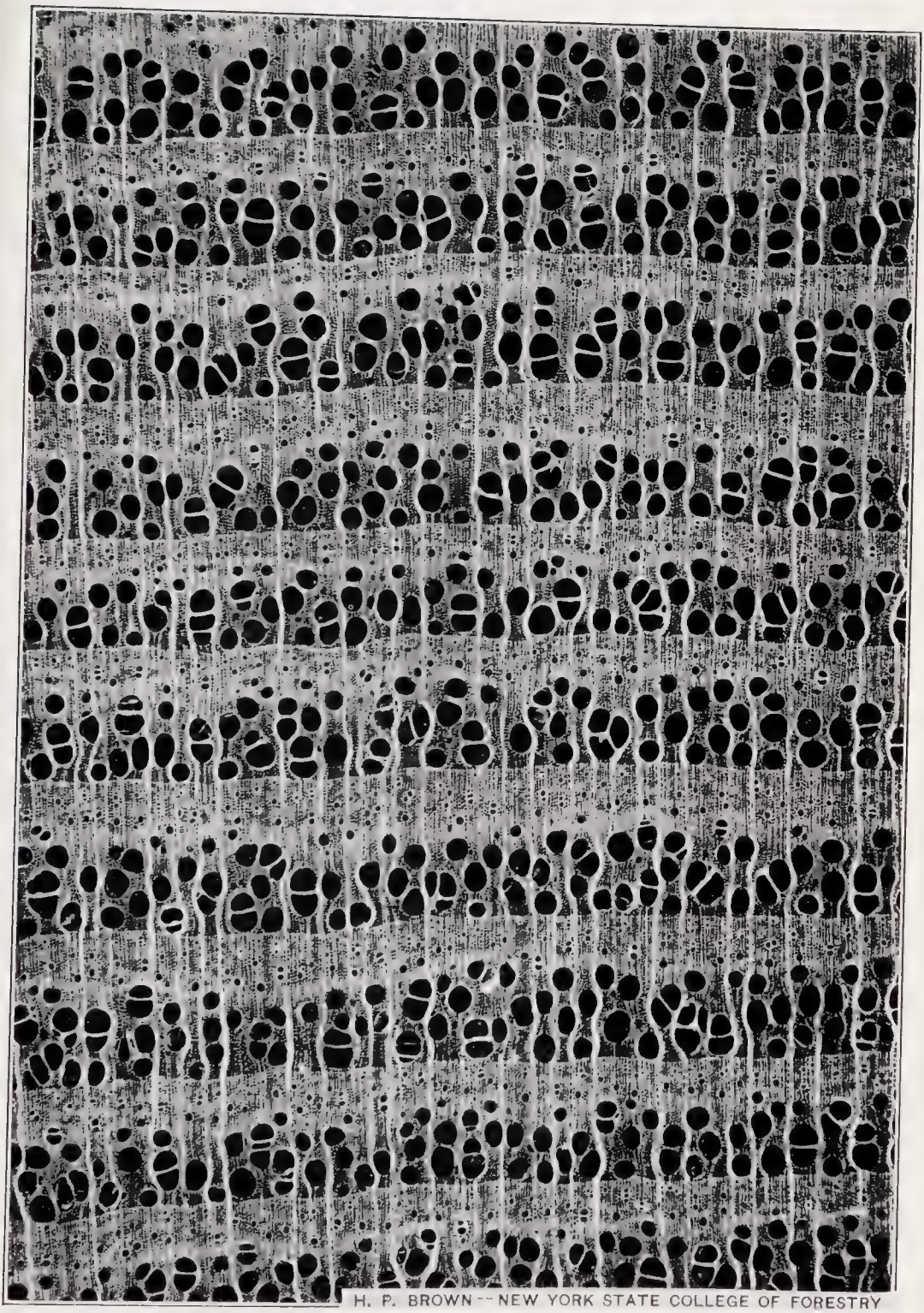
(X—15 diameters)



Yellow Poplar, Tulip Tree

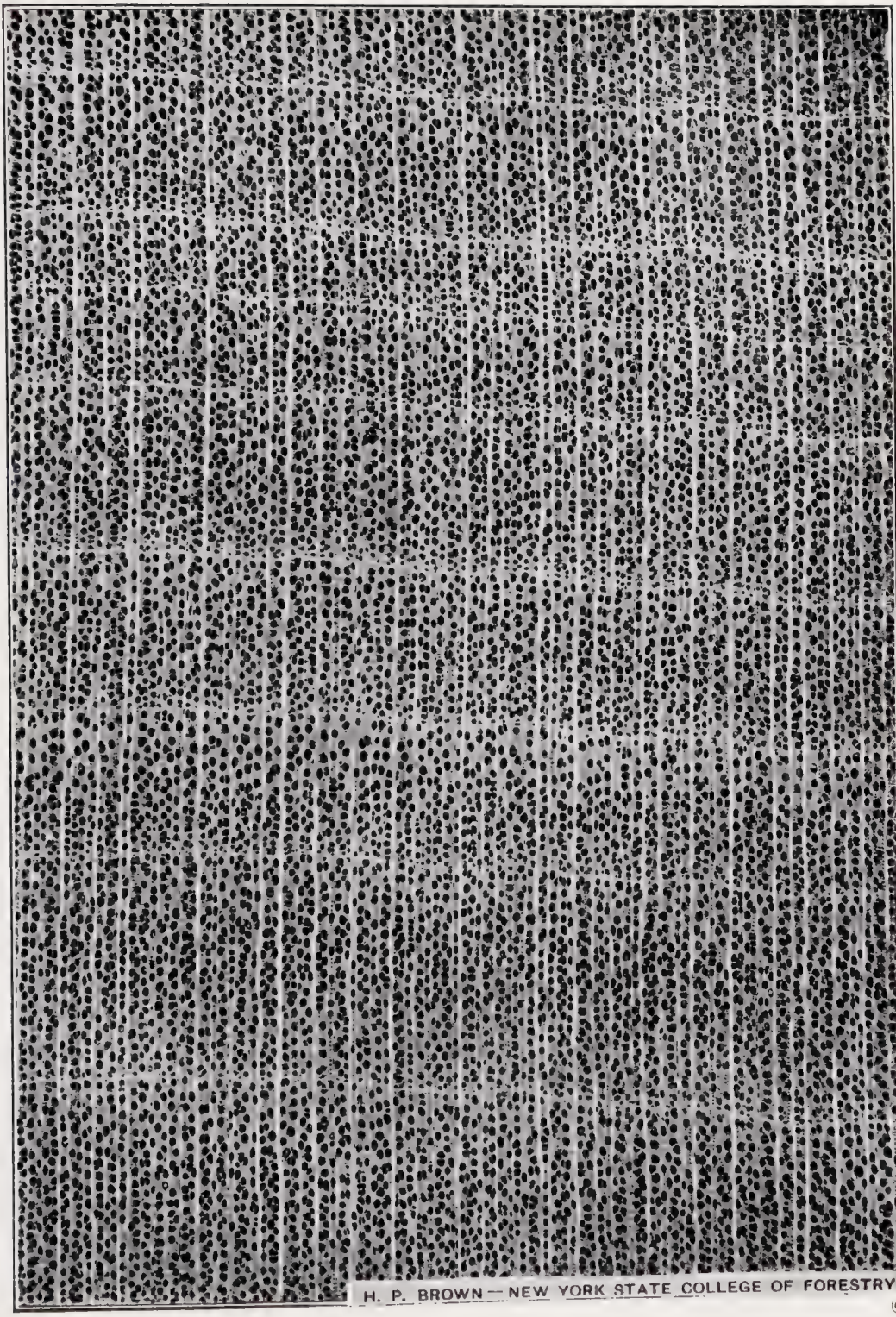
Liriodendron tulipifera L.

(X—15 diameters)



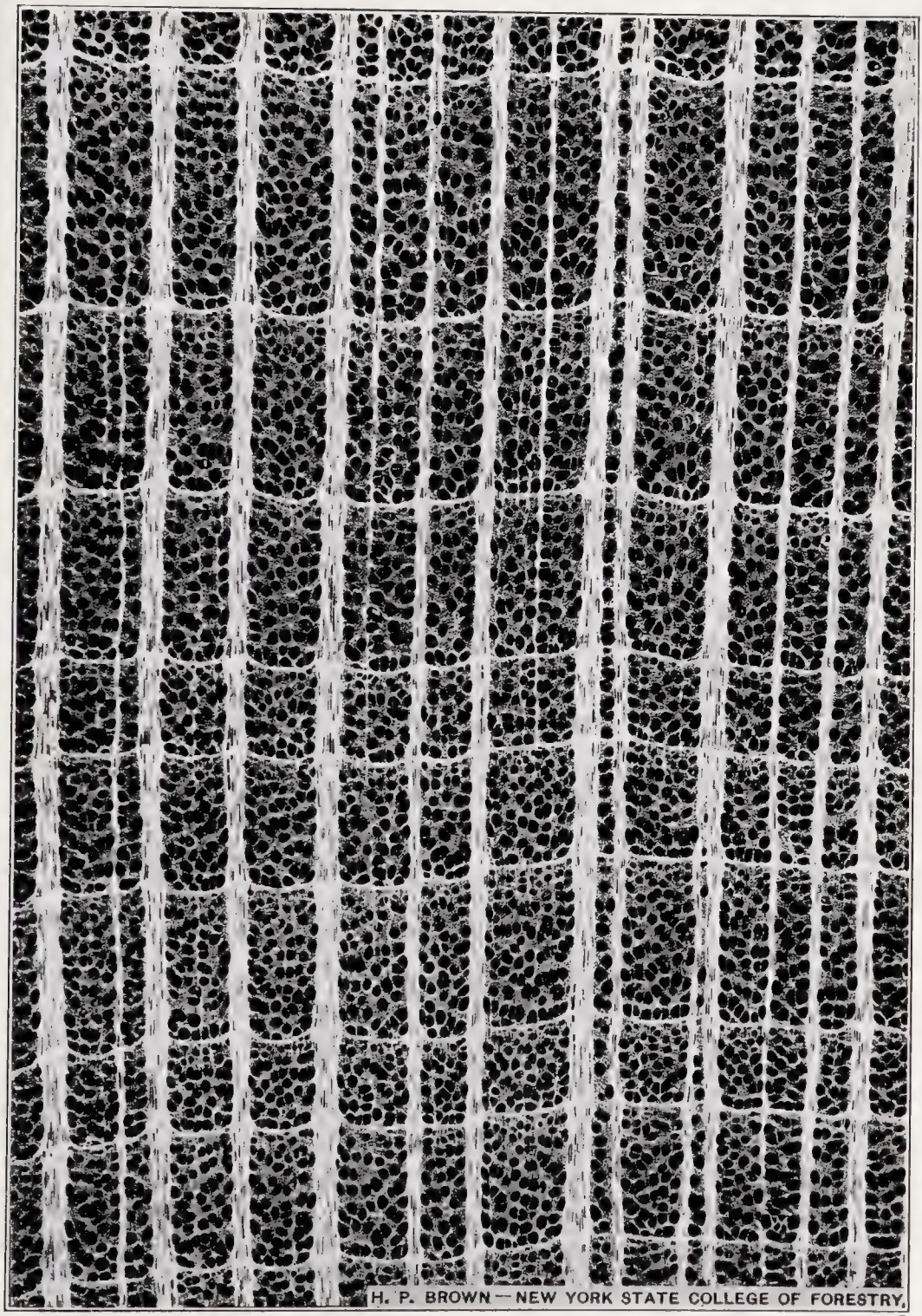
Sassafras

Sassafras officinale Nees et Ebermaier; Sassafras variifolium (Salisbury) Kuntze



Red Gum, Sweet Gum

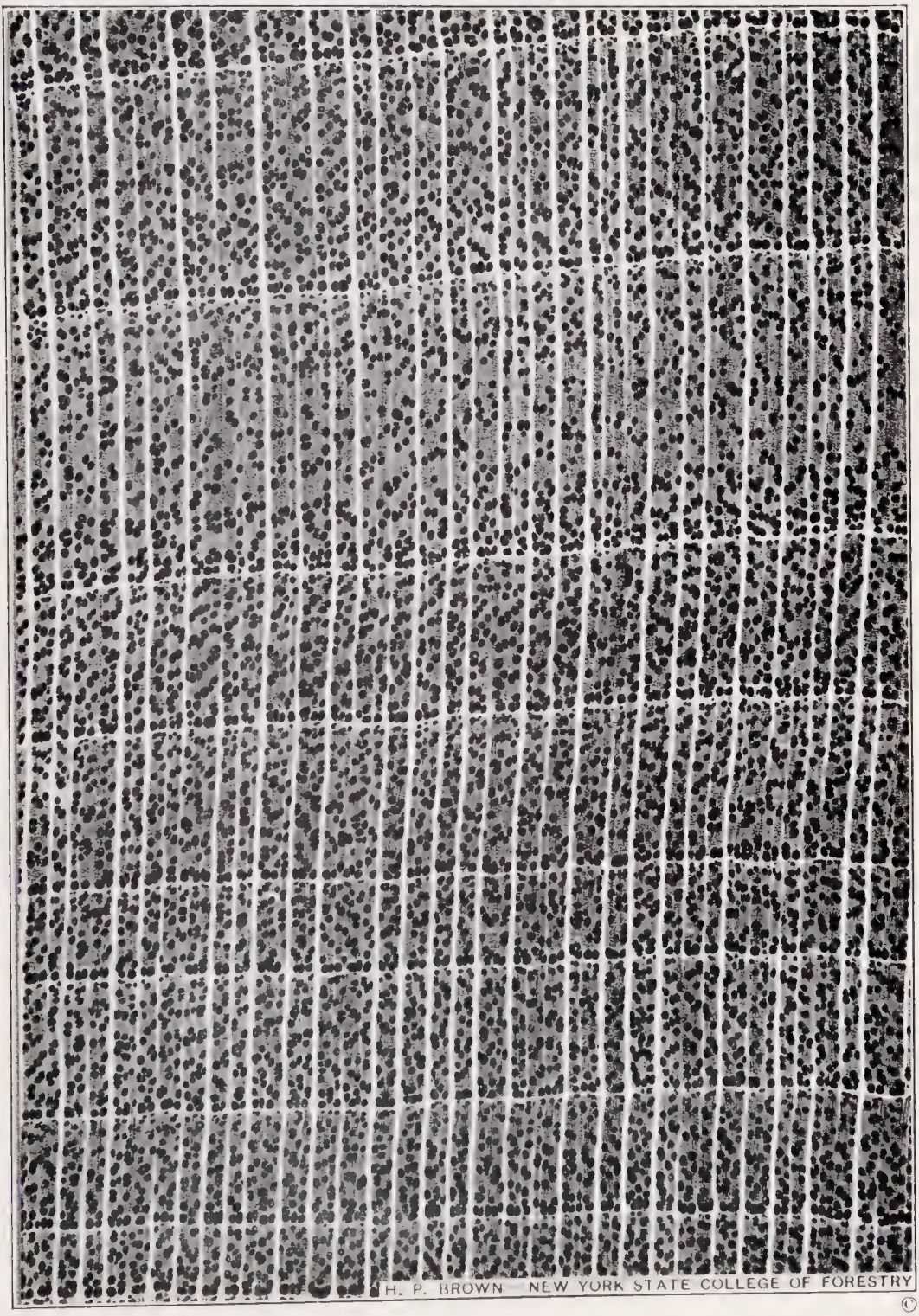
Liquidambar Styraciflua L.



Sycamore

Platanus occidentalis L.

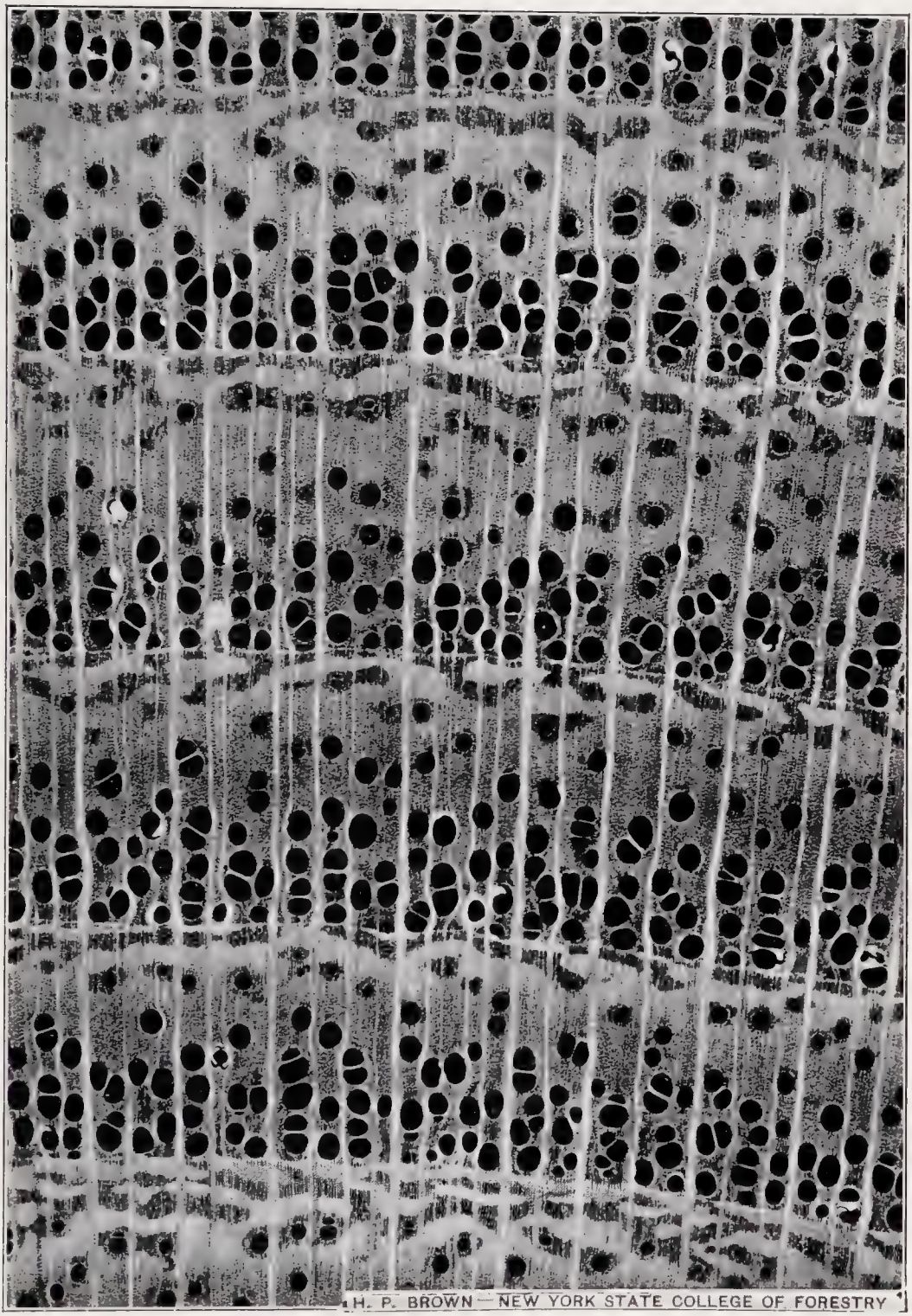
(X—15 diameters)



Black Cherry

Prunus serotina Ehrh.

(X—15 diameters)



Honey Locust

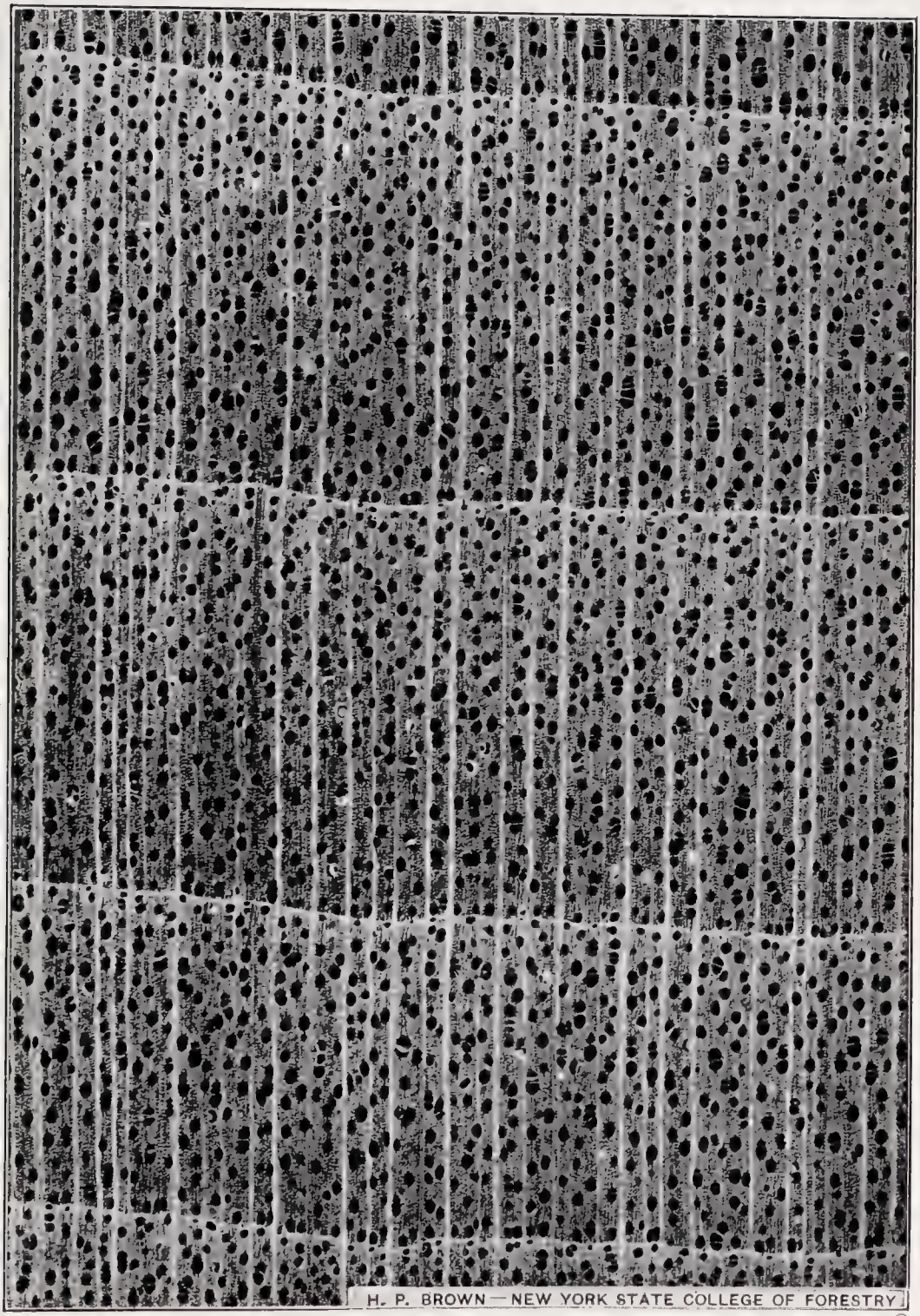
Gleditsia triacanthos L.

(X—15 diameters)

Black Locust

Robinia pseudoacacia L.

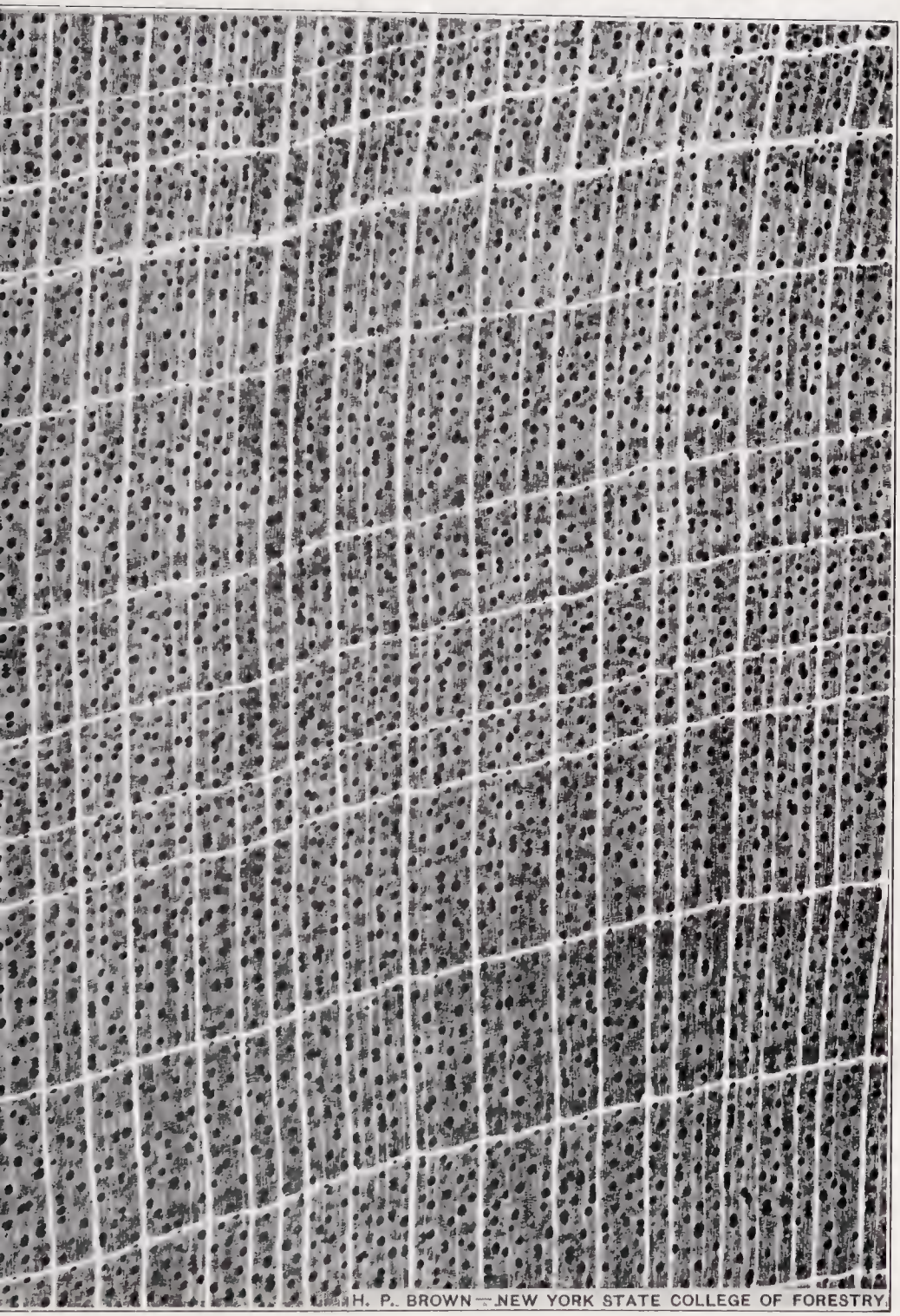
(X—15 diameters)



Bigleaf Maple, Oregon Maple

Acer macrophyllum Pursh.

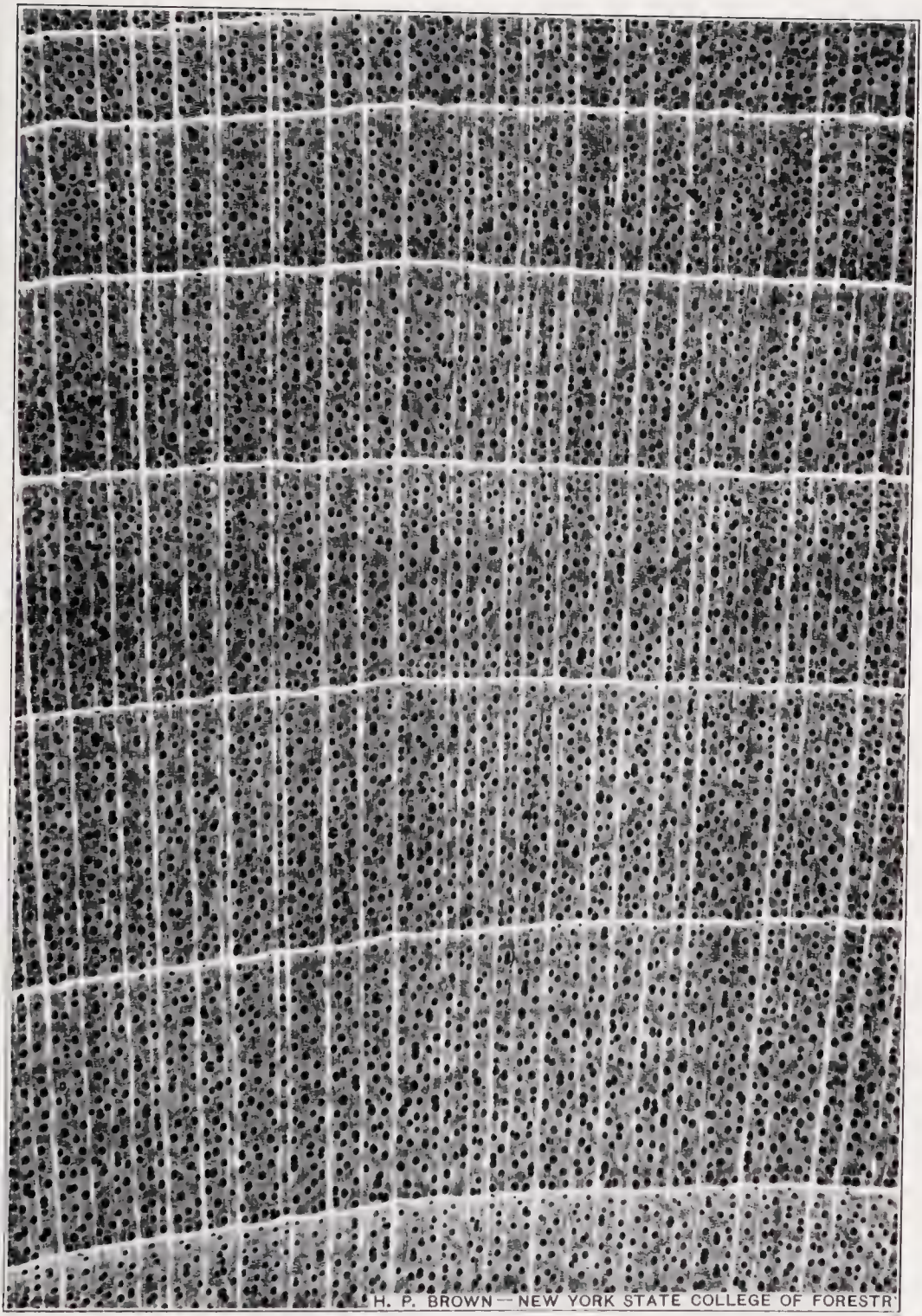
(X—15 diameters)



Sugar Maple

Acer saccharum Marsh.

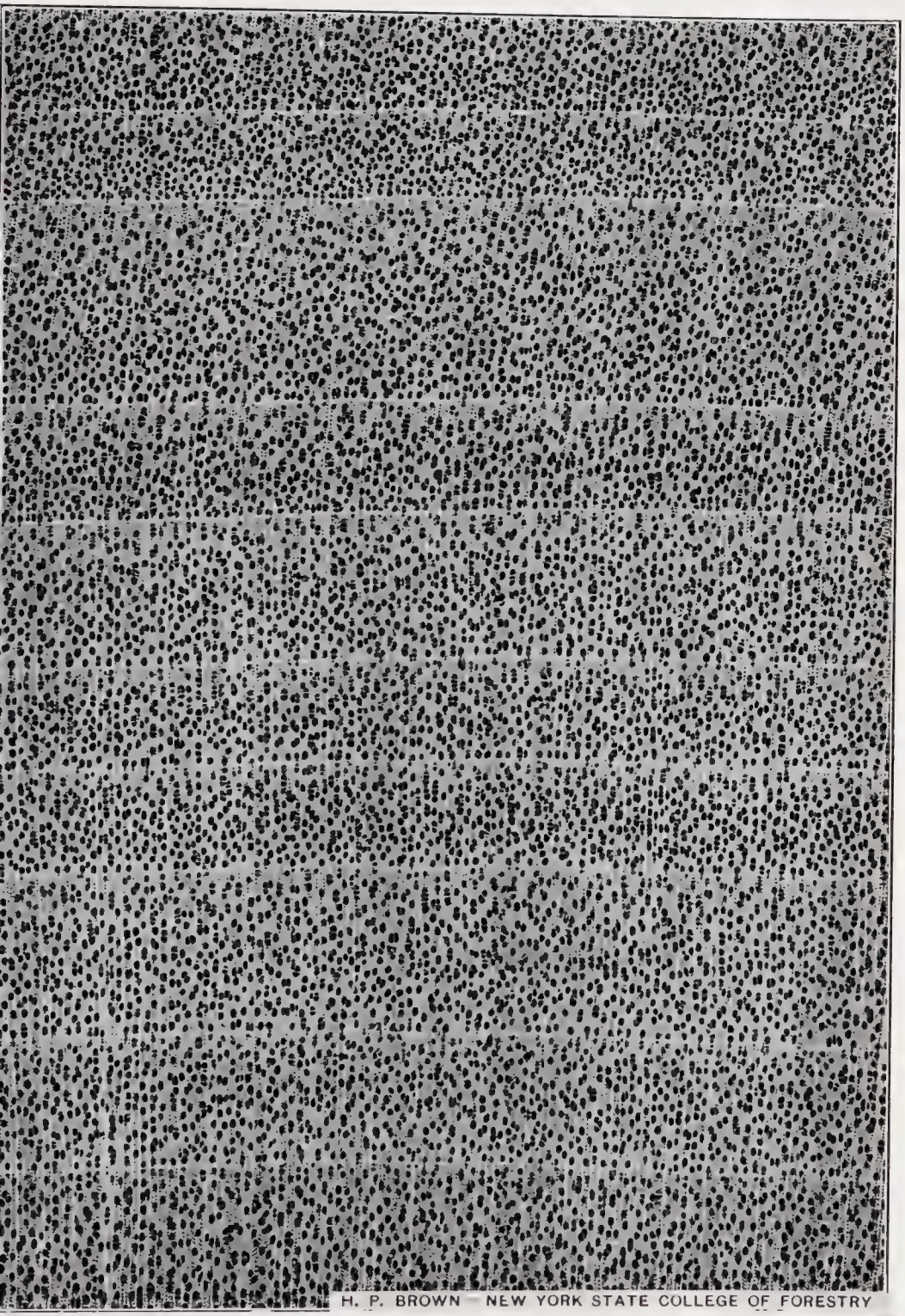
(X—15 diameters)



Red Maple

Acer rubrum L.

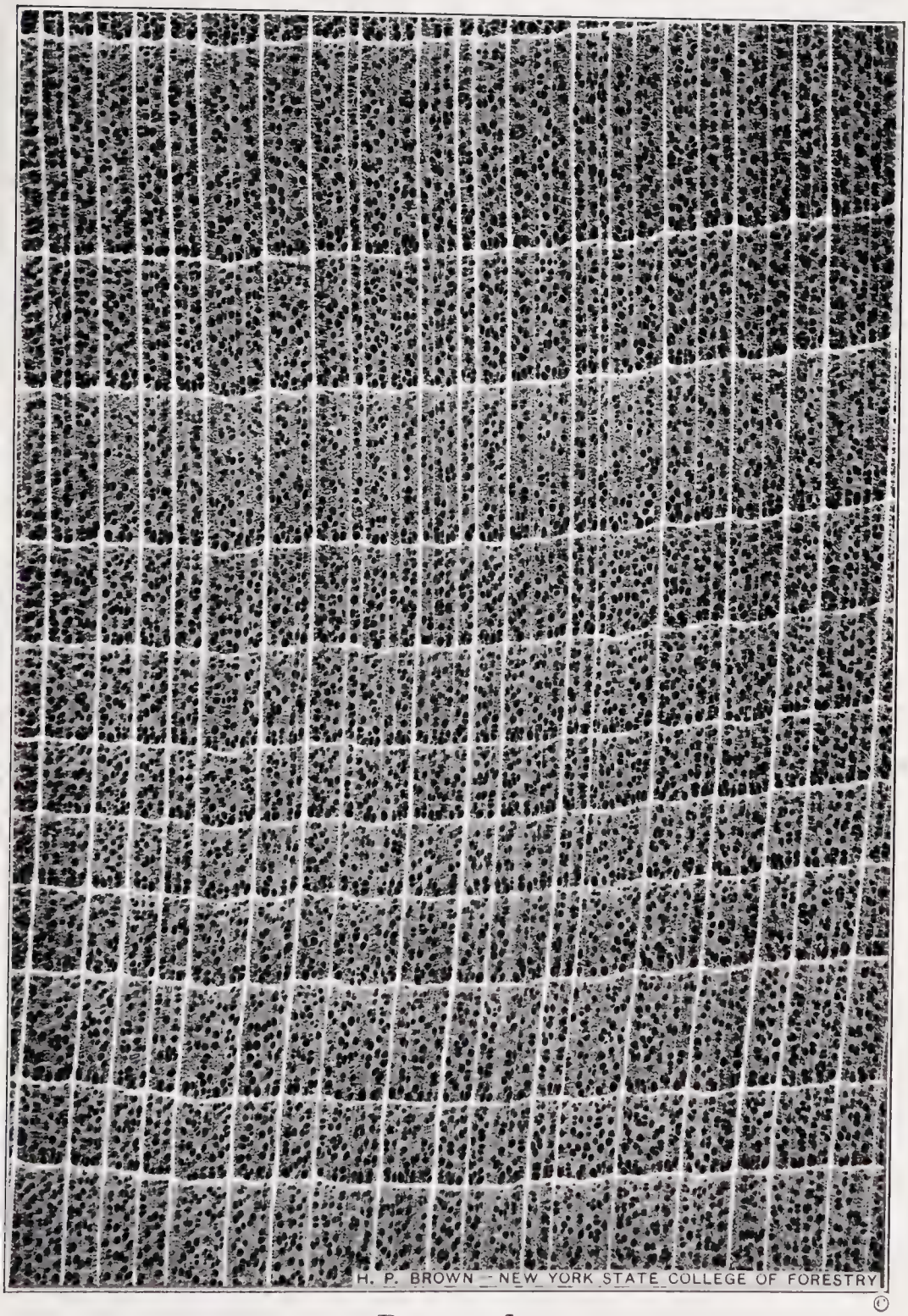
(X—15 diameters)



Yellow Buckeye, Sweet Buckeye

Aesculus octandra Marsh.

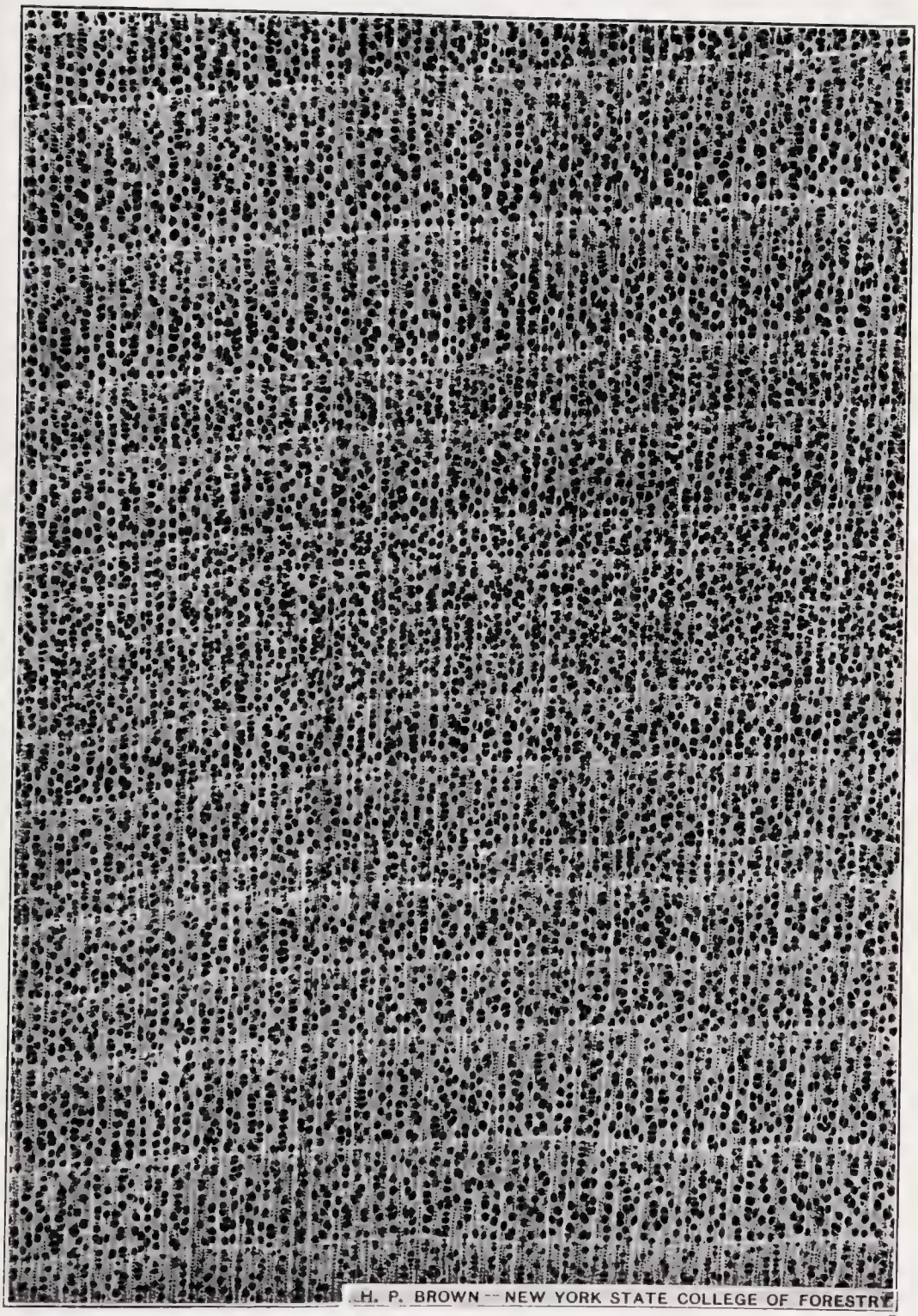
(X—15 diameters)



Basswood

Tilia glabra Vent.

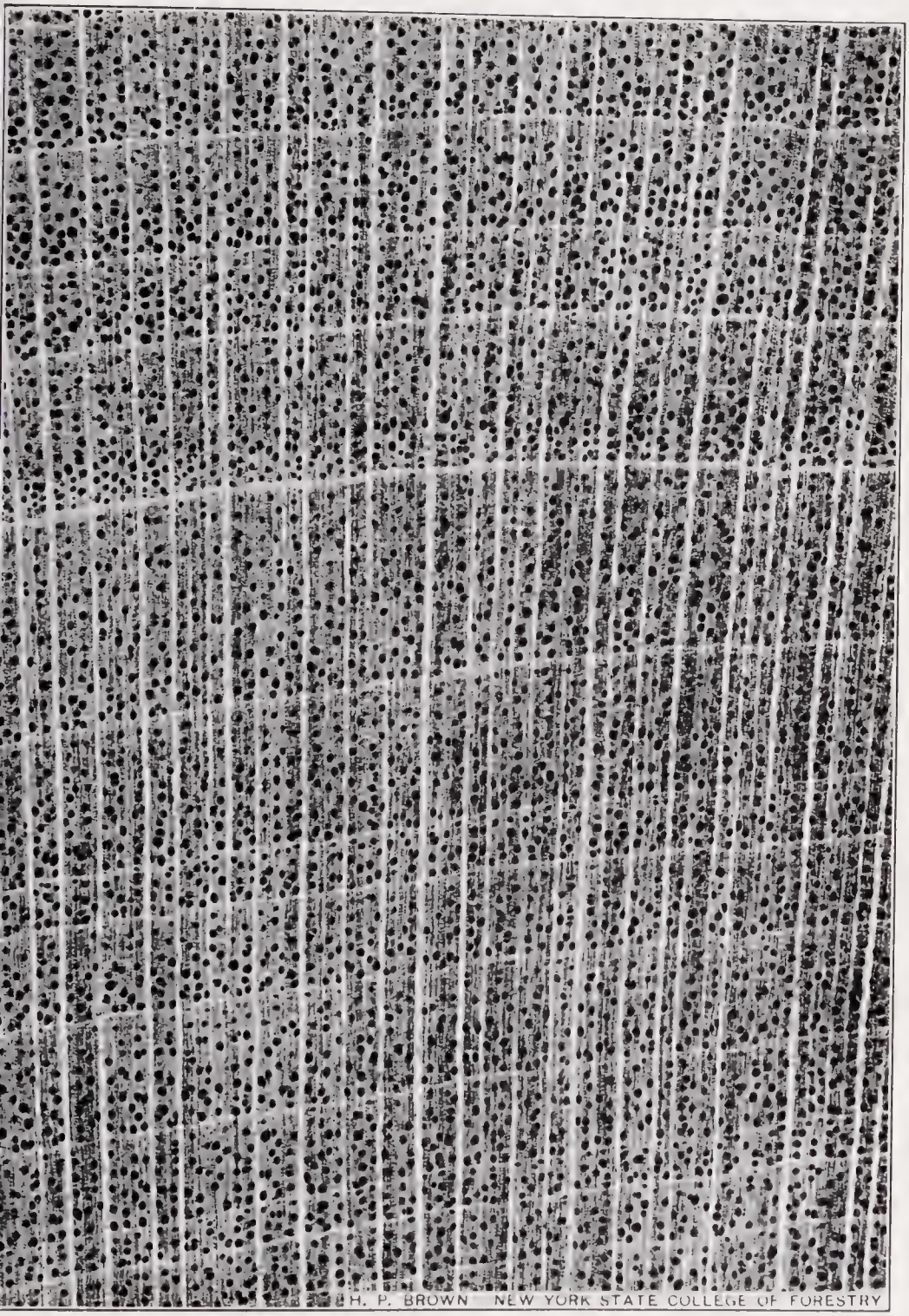
(X—15 diameters)



Black Gum, Sour Gum

Nyssa sylvatica Marsh.

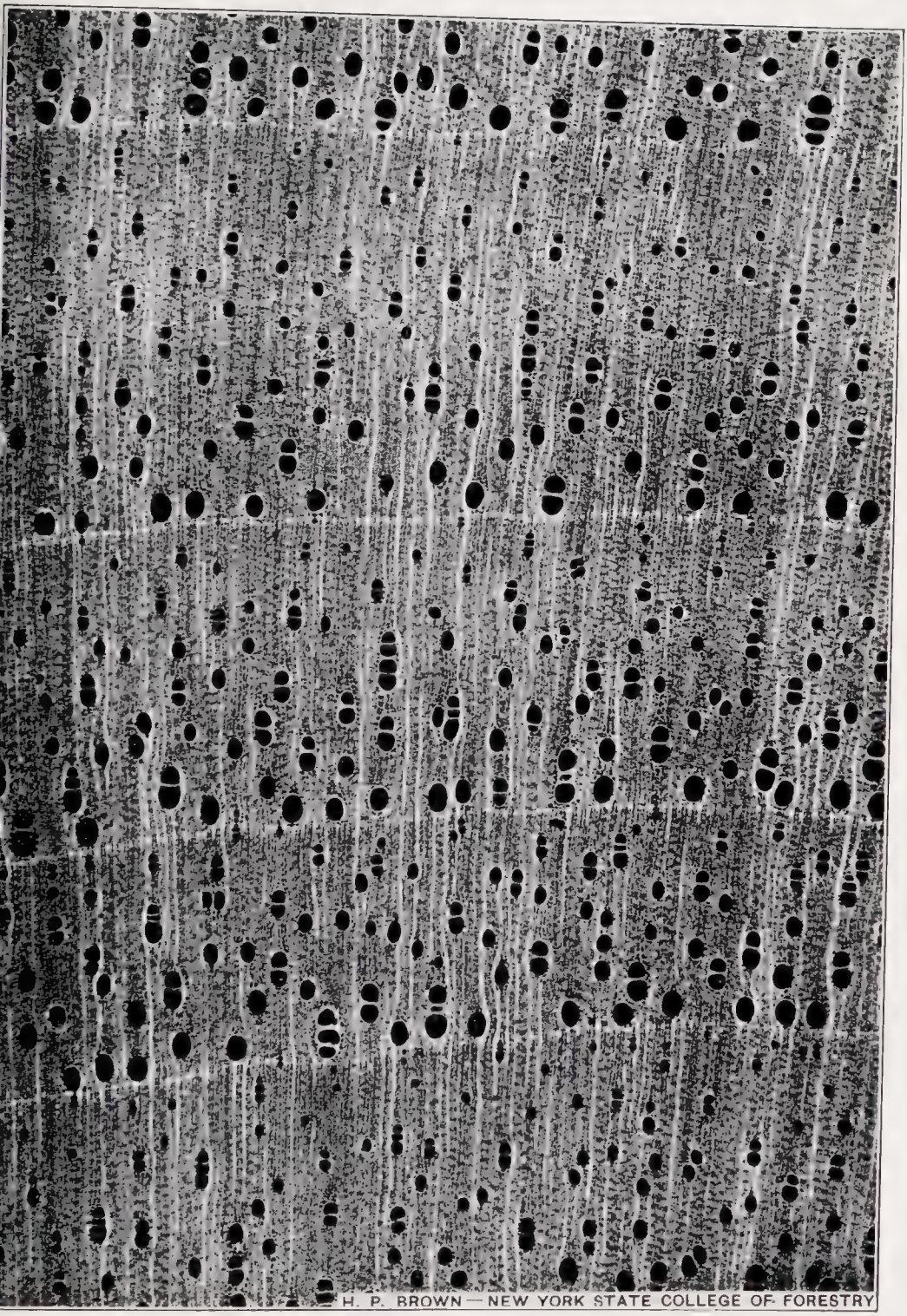
(X—15 diameters)



Dogwood, Flowering Dogwood

Cornus florida L.

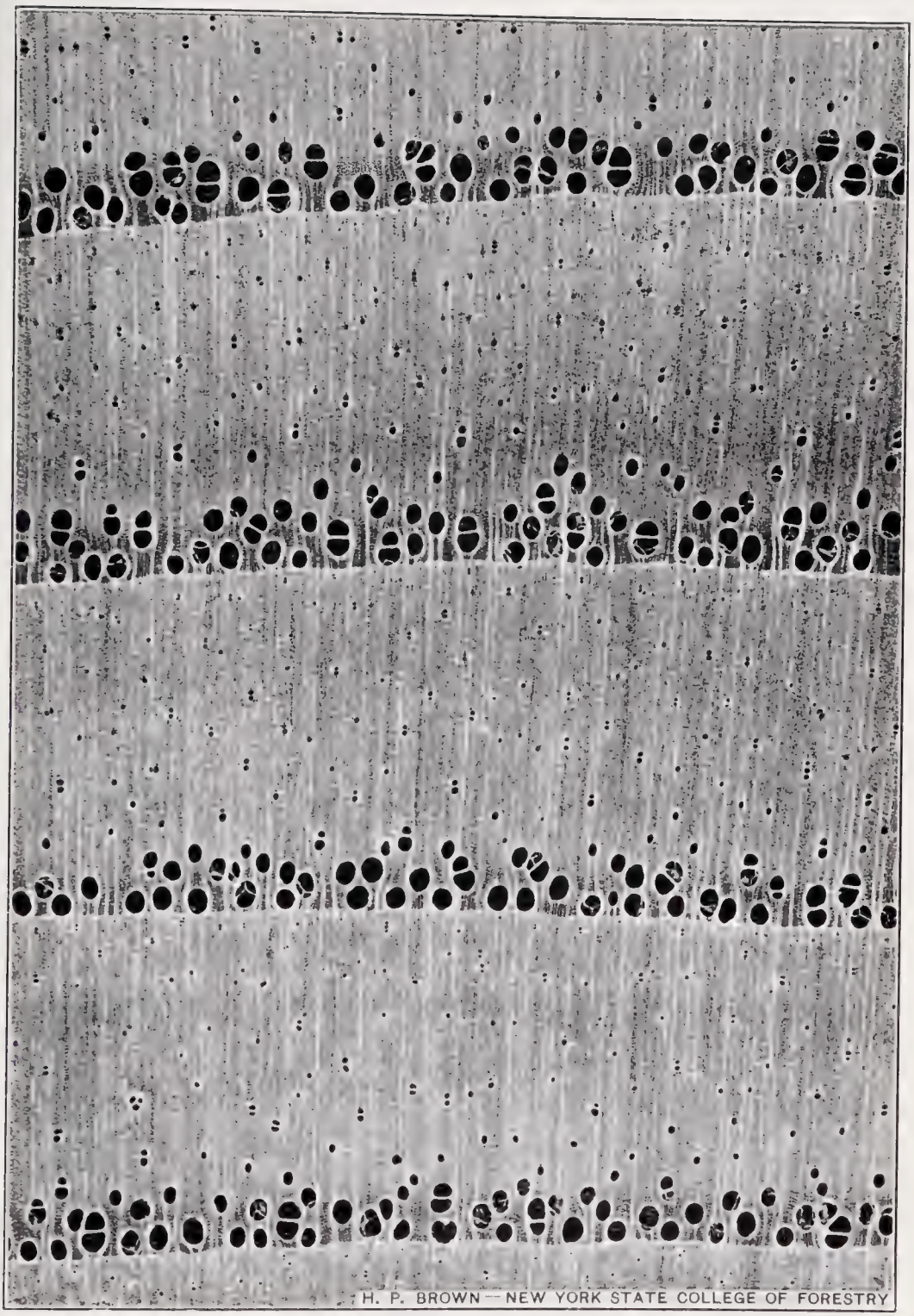
(X—15 diameters)



Persimmon

Diospyros virginiana L.

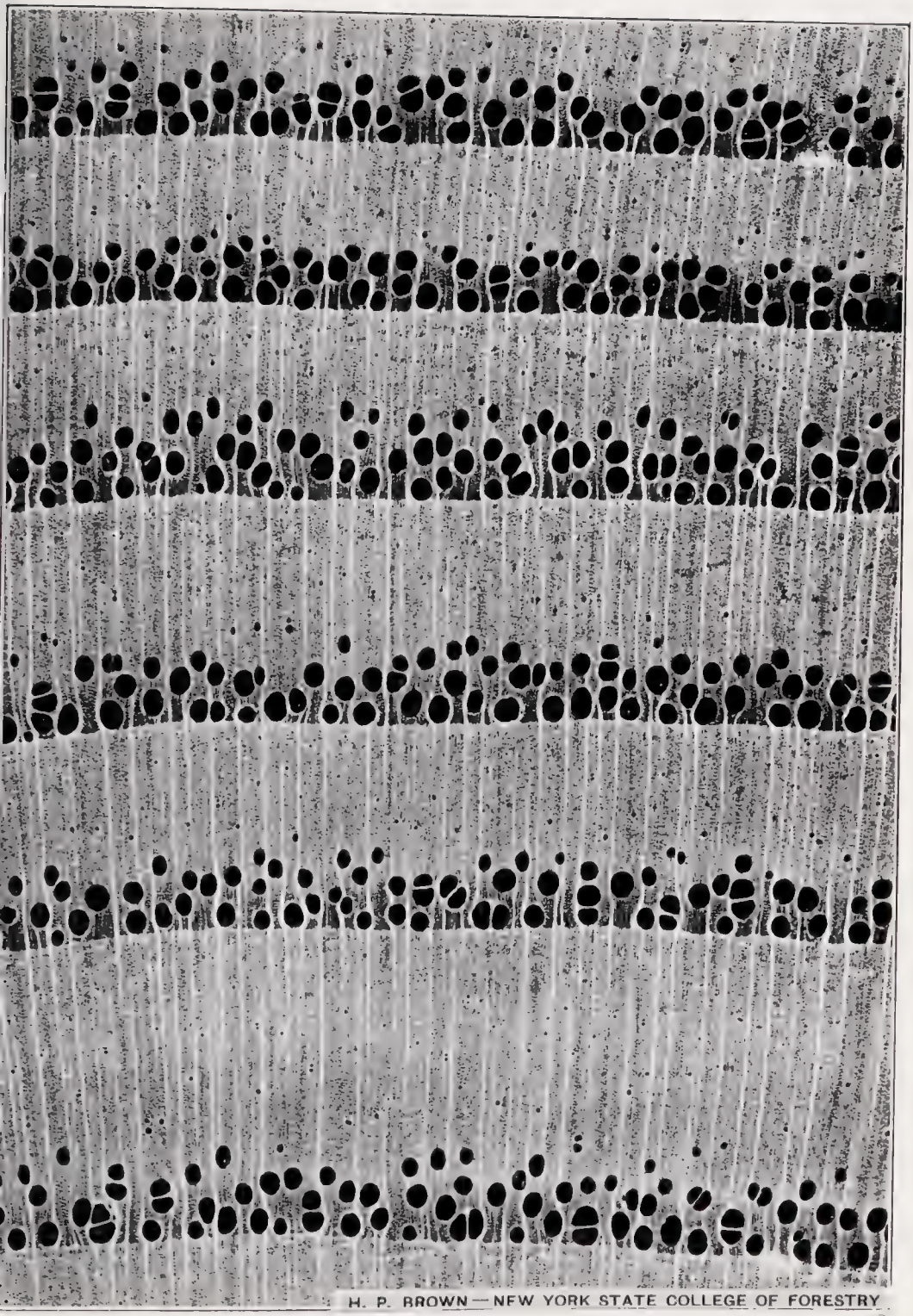
(X—15 diameters)



White Ash

Fraxinus americana L.

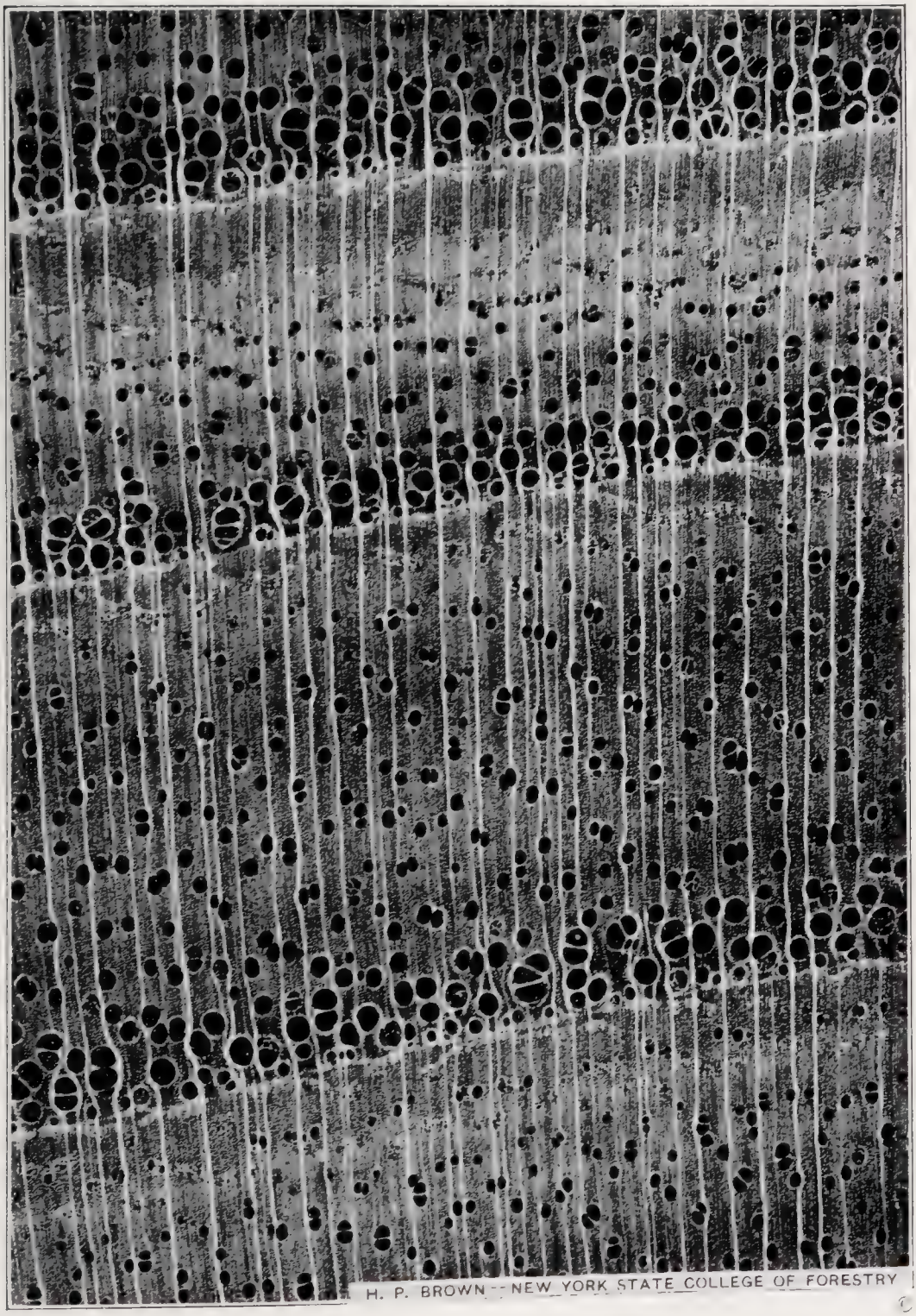
(X—15 diameters)



Black Ash, Brown Ash

Fraxinus nigra Marsh.

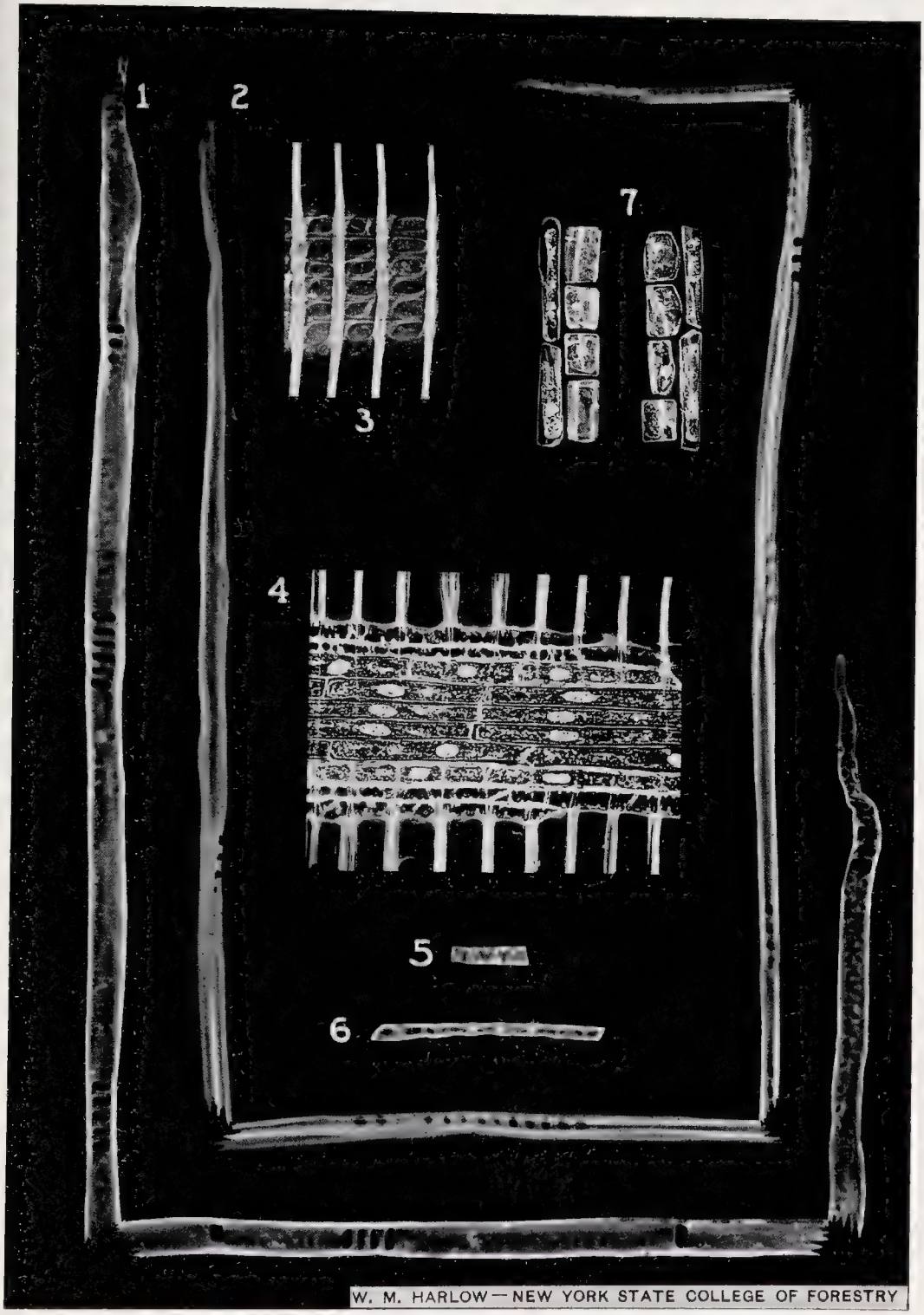
(X—15 diameters)



Hardy Catalpa

Catalpa speciosa Engelm.; Catalpa speciosa Warder.

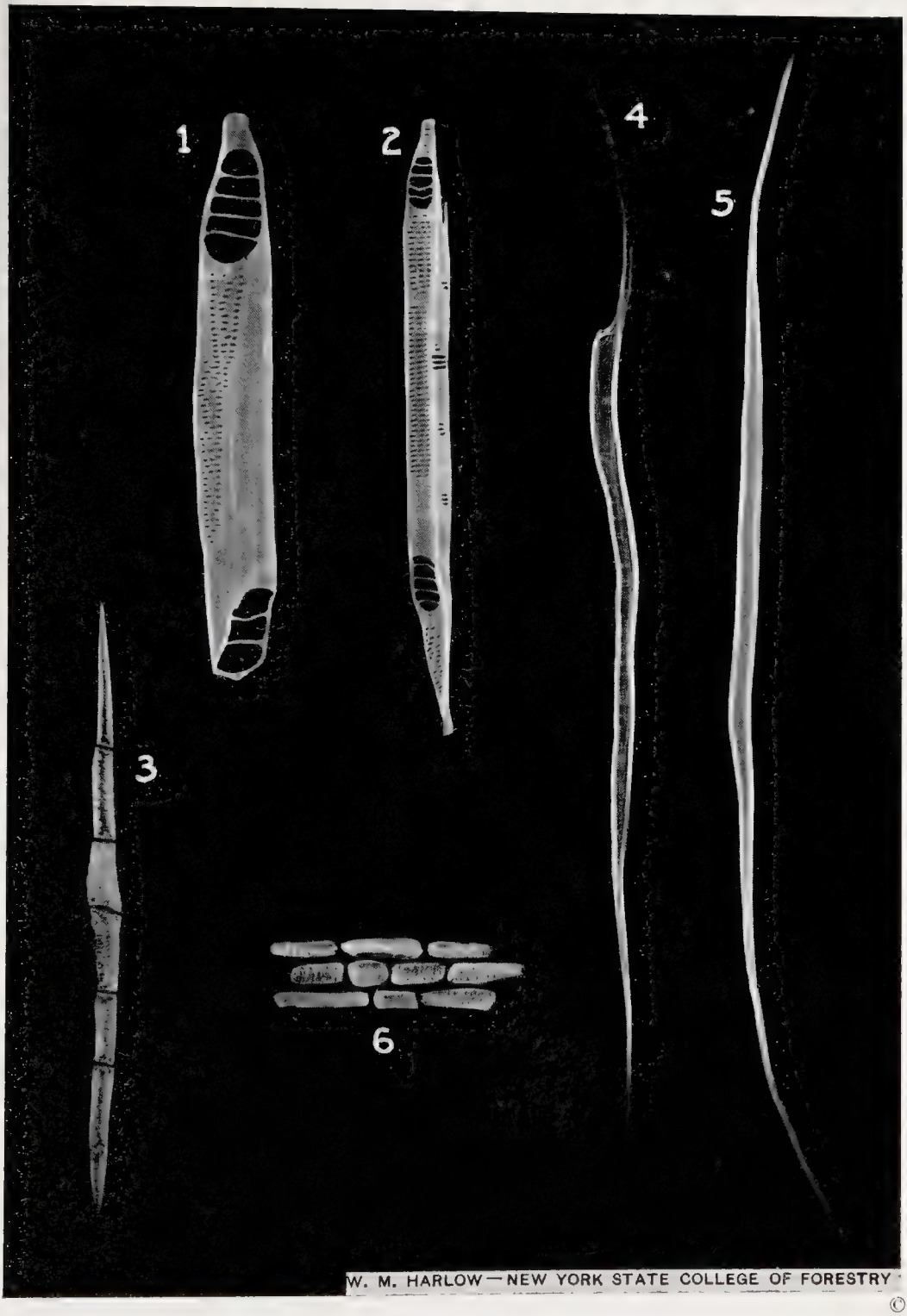
(X—15 diameters)



Elements of a Coniferous Wood

Red Pine, Pinus resinosa Ait.

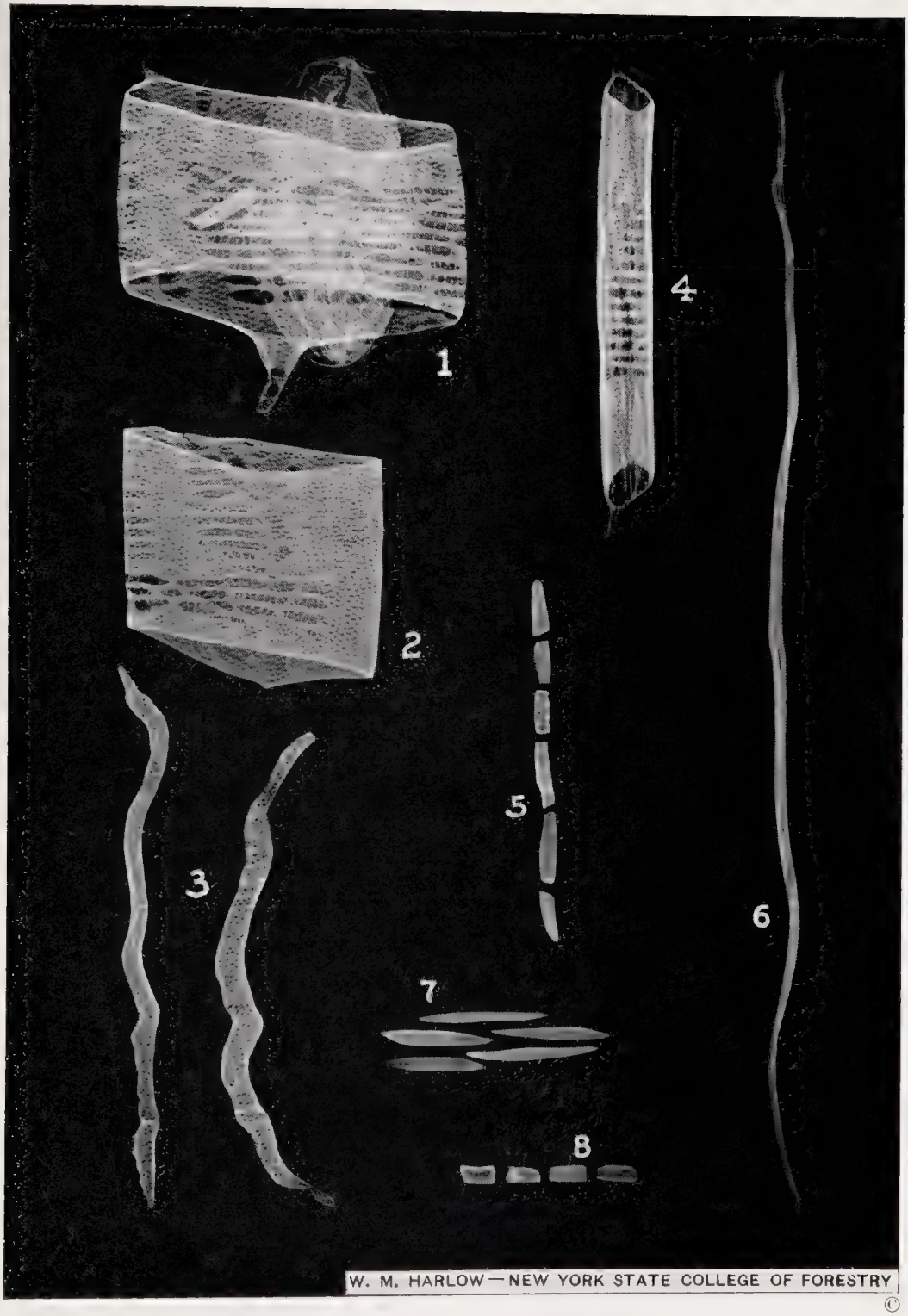
1. Springwood tracheid, x-90 (the linear groups of large window-like pits indicate the points of contact of the tracheid and wood rays). 2. Summerwood tracheid, x-90. 3. Lateral sectional view of a wood ray showing the window-like pits leading from ray cells to the longitudinal tracheids, x-120. 4. Lateral surface view of a wood ray showing ray parenchyma and marginal dentate ray tracheids, x-120. 5. Individual ray tracheid cell, x-90. 6. Individual ray parenchyma cell, x-90. 7. Epithelial cells showing grouping about the resin cavity, x-120.



Elements of a Diffuse Porous Hardwood

Yellow Poplar, Liriodendron tulipifera L.

1. Springwood vessel segment, x-90. 2. Summerwood vessel segment depicting radial and tangential walls, x-90. 3. Longitudinal parenchyma, x-90. 4–5. Fiber tracheids, x-90. 6. Ray parenchyma, x-90.



Elements of a Ring Porous Hardwood

Red Oak, Quercus borealis Michx.

1. Annular springwood vessel segment with solitary tylosis, x-90. Tyloses are sparse in this species. 2. Cylindrical springwood vessel segment, x-90. 3. Tracheids, x-90. 4. Tubular summerwood vessel segment, x-90. 5. Longitudinal parenchyma, x-90. 6. Fiber tracheid, x-90. 7. Parenchyma cells from compound ray, x-90. 8. Parenchyma cells from uniseriate ray, x-90.